THE IRON TRADE REVIEW

VOLUME XXXVI CLEVELAND, OHIO, DECEMBER 24, 1903 NUMBER 52

THE WEEK IN IRON CIRCLES.

THE MARKET AT LARGE.

The effect of the decisions made at the New York meetings of steel manufacturers last week cannot be judged as yet. It is the history of the trade that the closing fortnight of the year is no time in which to expect new business to spring up, even if there were general confidence in the prolonged maintenance of prices. The argument of the conferring manufacturers—and it may be well founded—is that at the present juncture business will not be stimulated by lowering prices. But the question on which the trade at large seeks light is whether the present basis for the heavy forms of finished material is the one on which consumers will do business freely when they are again ready to come into the market. In the few weeks preceding the New York meetings undoubtedly new orders and specifications on contracts were held back in the hope that lower prices could be had on the former and perhaps some readjustment on the latter. Such business may be expected to come to the mills early in the new year, for there is little doubt that delayed buying, rather than an abrupt falling off in consumption, has been the chief factor in the finished material trades for some time. It will not take many weeks of the new year to demonstrate whether the reaffirmed prices are the right prices.

The pig iron situation, which has been commented on lately as though it were apart from the trade in finished material, will find its place along with the latter. Active finishing capacity has been cut down very sharply by the waiting policy of the past two months. In foundry pig, even with stocks increasing under curtailed production, it has been assumed in some quarters that the way has been opened for improved prices. As yet the demand has not been of such proportions as to furnish a good basis for a judgment. In the past week further buying has been reported, though not of the volume of the two weeks preceding, but Northern furnaces have been more active in seeking business. For the most part $9.50 Birmingham for No. 2 has been the basis, but some iron has been marketed at $9.25. The firmer stand of the Alabama producers has been helped by a slight curtailment of production. A serious effort has been made to get a new agreement among Southern furnaces, and the co-operation was sought of a larger number of producers than the last association included, but at this writing there is little prospect that the movement will succeed. Four or five of the leading producers favored a $10 basis for the first quarter, but it was found that the wounds of the last association rupture were yet too fresh. Northern iron has sold at $13.25 at important Central Western consuming points where blast furnaces are located, and $13 at Mahoning or Shenango Valley furnace has been reached in the evident determination of Northern furnaces to get a share of what is going, under their cost adjustment effective Jan. 1.

The billet and finished material trades are waiting. All the large interests are again committed to the $23 basis for billets and the works not included in the agreement represent a relatively small tonnage. Structural work in considerable volume is in sight for the new year, but buying in the past week has been light. The trade in light rails has developed sharp competition and a meeting of manufacturers will be held at Pittsburg in the first week in January with a view to bettering the situation. Prices of boiler tubes have been reduced and a revision of pipe discounts is looked for. In the wire trade the volume of business has been better maintained than in heavy lines.

Foreign advices indicate a further decline in British iron and steel prices, with the outlook less promising.

PITTSBURG.

OFFICE OF *The Iron Trade Review*, 429 PARK BUILDING, Dec. 23.

At the meetings of the various steel associations, held in New York last week, prevailing quotations were reaffirmed, which action, for the most part, was expected, as the steel producers are making every effort to maintain present prices. The most important meeting was that of the steel billet association. The agreement was renewed for three months and quotations were reaffirmed for this period. A number of the independent mills that agreed to abide by the agreement made in November decided that it would be more advantageous to them to discontinue their further affiliation and announced that they would not further abide by the agreement. However, it can be said that a majority of the steel manufacturers who, for the first time, in November agreed with the leading steel producers to maintain prices, have agreed to the three months' arrangement. Conversion deals for steel are tabooed entirely, inasmuch as too much opportunity is provided for cutting prices, and furthermore all the large steel producers have more pig iron on hand than they desire and are not anxious to make conversion deals for steel for which the iron is furnished. On the other hand, a number of independent producers have operated very profitably on deals of this kind and are continuing to do so, with the result that the actual selling price of the steel is from $1 to $2 per ton below the association prices. Some of the smaller mills that have withdrawn from the association have already announced slight concessions in prices. The structural manufacturers agreed to continue their organization for another year and prices were again reaffirmed, while the plate manufacturers did likewise. Quotations on plates are being shaded by mills outside of the association, while at the current selling price of pig iron, the leading consumers, such as the steel car interests and shipbuilding concerns, having sliding scale contracts, are not compelled to pay the present agreed prices. The market on the lighter gauges of plates, which are really heavy sheets, from No. 9 to No. 12, inclusive, is open, and extremely low prices are being made. This has been done on account of the competition of the sheet mills which have been selling these sizes below the scheduled quotations of the plate manufacturers' association. Shafting manufacturers renewed their agreement for another year and reaffirmed prices, while the nut and bolt manufacturers went through the formality of reaffirming prices, which action means little, as the selling prices of all the manufacturers in the association have been below the agreed basis for some months.

Owing to the low prices at which light rails are selling, and the tremendous producing capacity, efforts will be made to maintain prices and limit production. A. F. Baumgarten, of the Union Rail Co., Huntington, W. Va., will call a meeting of these manufacturers, to be held the first week in January, to canvass the situation. The number of light rail mills has much increased in the past two years, with the result that the capacity far exceeds the demand. Light sections are

selling from $2 to $3 per ton below standard sections, although the cost of rolling is nearly twice as great.

A revised list of discounts on boiler tubes has been issued by the leading producer, some sizes being reduced only slightly, while on other sizes the reduction will average 10 percent. Independent manufacturers of boiler tubes have decided to meet these prices. A revised list of discounts on pipe will be issued shortly.

A majority of the sheet lodges of the Amalgamated Association of Iron, Steel and Tin Workers have voted to accept the reduction of 10 percent in wages and to increase the limit of output in all union sheet mills about 11 percent. This wage reduction and increase in the output limit will become effective on Jan. 1. The union mills of the American Sheet Steel Co., as well as those of the independent manufacturers, will profit by this move, but the non-union sheet mills of the American Sheet Steel Co. are still operating at an advantage, as the wage reduction there amounts to 20 percent.

Pig Iron.—The Northern pig iron market is a trifle weaker this week than last and No. 2 foundry for spot shipment has sold as low as $13.85, Pittsburg, while most brands are held at $14, with a few quoted at $14.25. There has been very little doing, the radiator foundries east of here doing the most buying for delivery the first quarter of next year at prices equivalent to $14.25, Pittsburg. The amount aggregates about 3,000 tons. There have been further sales of Northern forge iron amounting to about 5,000 tons at prices ranging from $13 to $13.50, Pittsburg. Bessemer iron is also weaker and is quoted at $13.25 to $13.50 at the furnace, while basic has sold at $12.90 at valley furnace. Southern operators are firmer, holding at a minimum of $9.50, Birmingham, for No. 2 while forge is quoted at $8.25, Birmingham. For delivery the first quarter as high as $10, Birmingham, is asked by some furnaces. The feeling in the South, judging from these prices, is more confident than that prevailing among the furnacemen in the North. We revise quotations as follows:

Bessemer, Valley	$13 25 to 13 75
Bessemer, Pittsburg	14 10 to 14 60
No. 1 Foundry	14 50 to 14 75
No. 2 Foundry	13 85 to 14 25
Gray Forge, Pittsburg	13 00 to 13 50
Chilled Basic, Valley	12 90 to 13 25
Chilled Basic, Pittsburg	13 75 to 14 10

Steel.—At the meeting of the steel manufacturers held in New York last Friday, quotations were reaffirmed for a period of three months, as was the agreement. Several of the independent manufacturers, however, decided to withdraw and are today naming prices somewhat below those quoted by the association. The following quotations were reaffirmed: Bessemer and open-hearth billets, 4 x 4 inches, and slabs, up to and including 0.25 carbon, $23, Pittsburg, Wheeling, Valley, Johnstown, Ashland, Ky., Ironton, O., and Lorain, O.; 0.26 and including 0.60 carbon, $1 advance and 0.61 to 1.00 carbon, $2 advance. Billets smaller than 3⅞ inches and sheet and tin bars are $1 per ton extra. Bessemer and open-hearth rods are quoted at $31, Pittsburg, but it is believed business could be done at $30.50.

Ferro-Manganese.—Domestic manganese, 80 percent, is quoted at $46 to $47 per ton, according to the tonnage, delivered at buyer's mill east of the Mississippi river. On large tonnages slightly better prices are named for nearby delivery.

Spelter.—The spelter market is somewhat stronger and prime Western grades are held at 4.70c to 4.75c, Pittsburg.

Muck Bar.—The market remains extremely quiet and quotations are nominal at $25, Pittsburg.

Skelp.—The skelp market, in keeping with the demand for pipe and tubing, is quiet and there are few sales being made. Grooved iron skelp is sold at 1.45c and sheared at 1.50c. Steel skelp is quoted at 1.40c to 1.45c.

Rails and Track Material.—A meeting of the light rail manufacturers will be called for the first week in January by A. F. Baumgarten, of the Union Rail Co. At present light rails are selling considerably below standard sections, despite the increased cost of rolling. Efforts will be made to curtail production as well as to maintain prices. The Edgar Thomson plant of the Carnegie Steel Co. is idle and will not resume until the middle of January. In the interval extensive repairs are being made. We make the following quotations: Standard sections, 50 pounds and over, in lots of 500 tons and over, $28; car lots and less than 500 tons, $30; less than car lots, $32; 16 and 20 pounds, $26.50 to $27; 25 to 40 pounds, $25 to $25.50. Track material: Spikes, 1.95c to 2c; track bolts, square nuts, 2.25c to 2.30c; hexagon nuts, 2.40c to 2.45c; fish plates, 1.60c on orders accompanying large rail contracts, otherwise 1.80c to 1.85c is asked.

Plates.—At the meeting of the plate manufacturers held last week, prices were reaffirmed. One or two mills outside of the association are known to be shading these prices, however. Quotations on the lighter gauges of plates, which are also rolled by a number of sheet mills and ranging from gauges 9 to 12, have been declared open by the plate manufacturers. Extras from 25 to 40 cents per ton have been secured for these sizes, but the competition of the sheet mills has cut out such extras almost entirely. Agreed quotations reaffirmed are as follows: Tank plates, ¼-inch thick and up to 100 inches in width, 1.60c at mill, Pittsburg; flange and boiler steel, 1.70c; marine, ordinary firebox, A. B. M. A. specifications, 1.80c; still bottom steel, 1.80c; locomotive firebox, not less than 2.10c, and it ranges in price to 3c. Plates more than 100 inches, 5c extra 100 pounds. Plate 3-16-inch in thickness, $2 extra; gauges Nos. 7 and 8, $3 extra. These quotations are based on carload lots, with 5c extra a hundred pounds for less than carload lots. Terms, net cash, in 30 days.

Bars.—There is no buying of either iron or steel bars to cover more than immediate requirements. Quotations on steel bars are being well maintained but on iron bars 1.25c Youngstown is being done on desirable tonnages. We make the following quotations: Bessemer steel bars, 1.30c; open-hearth, 1.40c; plow beams and cultivator beams, 1.30c, net; channels, angles, zees and tees, Bessemer, under 3 inches, 1.40c; common bar iron, 1.30c to 1.35c, Pittsburg. The following differentials are maintained on steel: Less than 2,000 pounds of a size and not less than 1,000 pounds, 10 cents advance; less than 1,000 pounds of a size, 30 cents advance. Hoops are quoted at 1.65c, full extras, in 250-ton lots and over, and 1.75c in less than 250-ton lots. Bands are quoted at 1.30c and take the bar extras.

Structural Material.—At the meeting of the structural manufacturers held last week the association was continued for another year and prices were reaffirmed. Little new business has been taken by the mills during the week. We quote as follows: Beams and channels, 3 to 15 inches, 1.60c; 18 to 24 inches, 1.70c; tees, 1.65c; zees, 1.60c; angles, from 3 to 16 inches, 1.60c; universal mill plates, 1.60c.

Sheets.—On Jan. 1 the wages of Amalgamated Association sheet workers in the independent sheet mills and those of the American Sheet Steel Co. will be reduced 10 percent, while the limit of output is increased about 11 percent. The sheet market remains quiet and on large and desirable orders concessions are being made from the quotations below. Black sheets, 500-bundle lots and over, are quoted as follows: No. 30, 2.75c; No. 29, 2.65c; No. 28, 2.35c to 2.40c; No. 27, 2.25c to 2.30c; Nos. 25 and 26, 2.20c to 2.25c; Nos. 22 and 24, 2.15c to 2.20c; Nos. 18 and 20, 2.10c to 2.15c; Nos. 14 and 16, 2.05c; Nos. 10 and 12, 1.75c to 1.80c. Galvanized, Nos. 10 to 17, 2.40c to 2.45c; Nos. 17 to 22, 2.60c to 2.65c; Nos. 22 to 25, 2.80c to 2.85c; Nos. 25 and 26, 3c to 3.05c; No. 27, 3.20c to 3.25c; No. 28, 3.40c to 3.45c; No. 29, 3.80c to 3.85c; No. 30, 4.30c.

Pipes and Tubes.—A revised list of discounts on both iron and steel boiler tubes has been issued by the largest manufacturer. It carries a reduction on all sizes averaging about 10 percent. A revision of the pipe list is looked for by consumers and no doubt will reach the trade by the first of the year. The pipe market generally continues quiet. We quote carload lots to consumers, f. o. b. Pittsburg, plus freight according to Tube Rate Book to destination:

MERCHANT PIPE.

	Steel Pipe.		Wrought Iron Pipe.	
	Black. Percent.	Galv. Percent.	Black. Percent.	Galv. Percent.
⅛, ¼ and ⅜ inch	68	58	65	55
½ inch	70	60	67	57
¾ to 6 inch	75	65	72	62
7 to 12 inch	69	59	66	56
Plugged and Reamed				
1 to 4 inch	73	63	70	60
Extra Strong Plain End				
⅛ to 8 inch	67	57	63	53
Threads only	66	56	62	52
Threads and Couplings	65	55	61	51
Double Extra Strong Plain End				

½ to 3 inch	59	49	55	45
Threads only	58	48	54	44
Threads and Couplings	57	47	53	43

NOTE.—Orders for less than carload will be charged at 12½ percent advance. Extra and Double Extra Strong Cut Lengths, lower random discounts by 10 percent net for 6 feet and longer, and 15 percent net for 3 to 6 feet.

BOILER TUBES.

Steel.

	Percent.
1 to 1½ inches	45
2¼ to 5 inches	62½
1¾ to 2¼ and 6 to 13 inches	52½

Iron.

	Percent.
1 to 1½ inches	36½
2¼ to 5 inches	45½
1¾ to 2¼ and 6 to 13 inches	35½

CASING.

	S. and S. Percent.
2 to 3 inches	58
3¼ to 4 inches	60
4¼ to 12½ inches	63

Wire and Wire Nails.—A fair amount of business continues to be done despite the winter season. Demand for cut nails has fallen off heavily, however. Concessions continue to be made and average as high as $4 to some delivered points. We quote as follows: Wire nails, carload lots, to jobbers, f. o. b. cars Pittsburg, $1.85 to $1.90; plain wire, carload lots, $1.75 to $1.80; barb wire, carload lots, $2.15 to $2.20; staples, carload lots, $2.05 to $2.10. Galvanizing, 30 cents extra. Carload lots to retailers are held at 5 cents advance in all lines, and on less than carload lots a further advance of 10 cents is charged. Steel cut nails are quoted as follows: Carload lots, $1.90, and less than carload lots, $1.95, f. o. b. Pittsburg, plus freight to point of destination. Iron cut nails are $1.90 in carload lots and $1.95 in less than carload lots. Terms, 60 days less 2 percent off in 10 days.

Merchant Steel.—At the meeting of shafting manufacturers held in New York last week the agreement was renewed for another year and prevailing prices reaffirmed. The shafting association has been a success in the past year and a half and has been of great assistance to the manufacturers in maintaining prices. We make the following quotations: Turned cold rolled and ground shafting, 52 off in carload lots and 47 percent off in less than carload lots. Tire steel, 1.70c to 1.80c; spring steel, 2.15c to 2.20c; toe calk, 2.15c to 2.20c. Tool steel is quoted 7 cents and upwards, according to the grade.

Coke.—Furnace coke for spot shipment is now being sold on the basis of $1.60 at the ovens, while strictly Connellsville foundry coke is quoted at $2 to $2.25. For delivery through the first half of the year furnace coke is quoted at $1.50 to $1.65 and foundry at $1.90 to $2.15. These quotations apply to strictly high grade Connellsville coke. However, a few of the operators in the region will not entertain any such prices and ask $2.25 and in some cases as high as $2.40 for foundry coke. For the week ending Saturday, Dec. 12, the output of the upper region amounted to 113,306 tons and that of the lower region 41,859 tons. About 13,000 ovens are idle in both regions.

CHICAGO.

OFFICE OF *The Iron Trade Review*,
1115 MONADNOCK BLOCK, Dec. 22.

With the reaffirmation of prices on all heavy finished steel products at the meeting of producers in New York last week, there is a better tone in evidence today in local iron and steel circles. While some dissent was expressed from the stand taken by producers, the general sentiment is one of satisfaction. Trade conditions in the West, however, seem far from being as bright as in districts farther east, and curtailed specifications on steel products continue to be received. The holiday season is in part responsible for this condition, as well as the nearness of the year's close and the fact that many concerns are engaged in taking inventory of their stocks; but it is expected the new year will bring with it a marked improvement.

Pig iron shows a healthy appearance and Southern grades are firm on the basis of $9.50 Birmingham No. 2. Quite a number of furnaces are sold up for the first quarter and have withdrawn from the market. Northern irons are more active. Bar iron is weak and reports are current that 1.30c is being shaded. There has been some activity in structural steel during the week, contracts being let with mills for two buildings calling for 900 tons and 250 tons respectively. Specifications on plates have also improved slightly, following the notification that after Jan. 1 this product will be sold at 1.60c Pittsburg, with actual freight to point of delivery added, making the Chicago price 1.76½c. Transactions in light rails continue a bright feature in Western trading, though specifications for heavy sections are light. The mill at South Chicago will be shut down Thursday for the holiday season, and as the opportunity will be taken to make some necessary changes and repairs it is not known now when it will be started up again. The plate mill is already shut down. Scrap is firmer than it has been for some time, due to the recent heavy falls of snow in Western districts, and there has been good trading during the week under review.

Pig Iron.—The week has developed no changes worthy of special mention. Buyers have taken hold quite freely and with little persuasion are placing contracts for their requirements in the first three months of the new year. Many would cover for longer periods, but the sentiment of furnaces is generally to discourage such buying. A number of producers have sold their capacity for the first quarter and have withdrawn from the market. Nothing less than $9.50 Birmingham for No. 2 seems available, and some furnaces are asking $9.75. Trading in Northern irons has been equally active and $14.50 Chicago for No. 2 is the usual basis. One interest has booked some orders for deliveries extending right through the year at this price but generally speaking is not encouraging such business. A number of malleable foundries have negotiated for their wants in the first quarter during the week, the basis for malleable Bessemer being $14.50 Chicago. The statement in this report last week that malleable pig had sold at $14 Chicago should have read $14 at the furnace. There has been some demand for low grade irons, and gray forge is held at $8.50 Birmingham. We have revised our quotations to meet the changed conditions, and quote as follows:

Lake Superior Charcoal	$16 50 to 17 00
Northern Coke Foundry No. 1	15 00 to 15 50
Northern Coke Foundry No. 2	14 50 to 15 00
Northern Coke Foundry No. 3	14 00 to 14 50
Northern Scotch Foundry No. 1	15 50 to 16 00
Ohio Strong Softeners No. 1	16 80 to 17 30
Ohio Strong Softeners No. 2	16 30 to 16 80
Southern Coke Foundry No. 1	13 85 to 14 10
Southern Coke Foundry No. 2	13 35 to 13 60
Southern Coke Foundry No. 3	12 85 to 13 10
Southern Coke Foundry No. 4	12 35 to 12 85
Southern Gray Forge and Mottled	12 35 to 12 85
Southern Silveries (4% to 6% Silicon)	16 50 to 17 50
Jackson Co. Silveries (8% to 10% Silicon)	18 50 to 19 50
Alabama and Georgia Car Wheel	19 85 to 20 85
Malleable Bessemer	14 50 to 15 00
Basic Iron	14 35 to 14 85

Bar Iron.—Bar iron shows little life and offerings at 1.25c are reported to have been made. This cannot be confirmed, however, all the local mills reporting 1.30c as their minimum. New business in steel bars is light, though contract specifications are of fair proportions. We quote iron bars, 1.30c to 1.35c Chicago, carload lots, mill shipments, half extras. Steel bars 1.46½c half extras, Chicago delivery, carload lots, mill shipments, with 5c to 10c extra for less than carload lots; angles, less than 3 x 3, 1.56½c base, half extras; hoops, 1.81½c carload lots, full extras. Jobbers' quotations on carload lots and less: Iron, 1.60c to 1.75c base full extras; steel, 1.60c to 1.70c; small angles, channels and tees, less than 3 x 3, 1.70c to 1.80c; hoops, 2.10c rates, full extras.

Billets.—Aside from a few carload lots which have been negotiated, the market is without interest. We quote the official schedule of $24 Chicago, carload lots on open-hearth and Bessemer billets either for rerolling or forging.

Sheets.—Demand is of light proportions and mills report no change in prices. We quote black sheets, carload lots, mill shipments: No. 27 gauge, 2.46½c to 2.51½c; No. 28 gauge, 2.51½c to 2.56½c; galvanized from mill, 75, 10 and 7½ to 80 percent. Store prices are without material change, as follows: No. 16, 2.45c; Nos. 18 and 20, 2.55c; Nos. 22 and 24, 2.60c; No. 26, 2.70c; No. 27, 2.80c; No. 28, 2.90c; galvanized from store, 75 and 7½ percent.

Plates.—A slight improvement was noted in specifications since the reaffirmation of the prevailing schedule at the New York meeting last week. The local plate mill, however, has been shut down for the holiday season. It is announced that after the first of the year the price of plates will be 1.60c Pittsburg, with freight to point of delivery added, increasing the cost to Chicago consumers 30 cents a ton. We continue to quote mill shipments, Chicago delivery, as follows: Tank steel, ¼-inch and heavier, 1.75c; flange steel, 1.85c. From store we quote small lots: Tank steel, ¼-inch and heavier, 1.90c to 2c; 3-16, 2c to 2.10c; No. 8, 2.10c to 2.20c; No. 10, 2.15 to 2.25c; flange steel, 2.25c, all f. o. b. warehouse.

Structural Steel.—There has been a fair demand for small lots from warehouse stocks, but aside from two orders for 900 tons and 250 tons respectively placed with producers, mills report a quiet week. We quote mill shipments, Chicago delivery, as follows: Beams and channels, 16 inches and under, 1.76½c; 18 inches and over, 1.86½c; universal plates, 1.75c; angles, 3 x 3 and larger, 1.76½c; tees, 3 x 3 and larger, 1.81½c; zees, 1.76½c. On lots from store, we quote beams, channels and angles, 3 x 3 and larger, 1.90c rates; 18, 20 and 24-inch, 10c extra; tees, 1.95c rates.

Merchant Steel.—An improvement is reported in mill specifications, though the volume of new business is low. Prices are firm and without change. We quote mill prices, Chicago delivery: Spring steel, 2c; sleigh shoe, flat sizes, 1.60c; concave and convex, 1.75c; cutter shoe, 2.25c to 2.30c; smooth finished machinery steel, 1.71½c base; plow steel, 2.50c and upwards, according to quality; toe calk, 2.01½c to 2.11½c. Ordinary grades of tool steel, 6c to 8c; specials, 12c and upwards. Cold rolled shafting in carload lots, 52, and in less than carload lots, 47 percent discount from list.

Merchant Pipe.—While new business is not large, mills report that specifications are voluminous enough to indicate that the consuming trade is in a healthy condition. Stocks throughout the country are low and a good business is expected after the first of the year. Prices are unchanged and we quote to consumers carload lots, mill shipments, random lengths, f. o. b. Chicago as follows:

	Steel Pipe.		Guaranteed Wrought Iron Pipe.	
	Black. Percent.	Galv. Percent.	Black. Percent.	Galv. Percent.
⅛ to ¾ inch inclusive.....	66.35	56.35	63.35	53.35
½ inch	68.35	58.35	65.35	55.35
¾ to 6 inches	73.35	63.35	70.35	60.35
7 to 12 inches inclusive ...	67.35	57.35	64.35	54.35

Less than carload lots, 12½ percent advance over above prices.

Boiler Tubes.—There is no change to report, the market continuing quiet. We quote carload lots from mill, Chicago delivery, as follows:

	L. W. Steel. Percent.	C. C. Iron. Percent.	Seamless Steel. Percent.
1 to 1½ in.	40.35	37.35	53.35
1¾ to 2½ in.	53.35	36.35	40.35
2¾ to 5 in.	59.35	49.35	Up to 4 inches.
6 to 13 in.	53.35	36.35	48.35

For car lots or less, direct from warehouse stock:

	L. W. Steel. Percent.	C. C. Iron. Percent.	Seamless Steel. Percent.
1 to 1½ in.	40	35	37.50
1¾ to 2½ in.	50	32.50	35
2¾ to 5 in.	57.50	42.50	Up to 4 inches.
6 to 13 in.	50	32.50	45

Cast Iron Pipe.—New business continues light, little pipe being laid in the winter months, though in the East something has been done, including 5,000 tons for New York City. Prices are without change, and we quote carload lots, f. o. b. Chicago: 4-inch water pipe, $28; 6-inch and upwards, $27; gas pipe $1 a ton higher.

Rails and Track Supplies.—Trading in light rails has been brisk during the week and a large tonnage has been booked. Specifications for heavy sections, however, are coming in slowly. The local rail mill will be shut down Thursday next for the holidays. It is quite probable it will remain idle until after the first of the year, as the opportunity will be taken to make some necessary repairs and changes. We quote standard sections, 500 tons and over $28; less than 500 tons to carload lots, $30; less than carload lots, $32; second quality rails, $27; 25-pound rails, $26 to $28; 12-pound rails, $28 to $30, with regular differentials for intermediate sizes. Track supplies, mill shipments, angle bars, 1.70c to 1.80c; spikes, first quality, 1.85c to 1.95c (out of store, 2.10c to 2.20c rates); second quality, 1.55c to 1.65c; track bolts, 3½ x ¾, with square nuts, 2.40c to 2.50c per 100 pounds (from store, 2.80c to 2.90c); with hexagon nuts, 2.55c to 2.65c (from store, 3c), with usual differentials for other sizes.

Wire Products.—Mills report that jobbers are sending in specifications freely for spring requirements, and that the tonnage booked is of good proportions. No changes in prevailing prices have been made, and we quote to jobbers, Chicago delivery, as follows: Wire nails, carload lots, $2.15; less than carload lots, $2.20. Cut nails, steel, carload lots, $2.05; less than carload lots, $2.10. Plain wire, $2.05 carloads, and $2.15 in smaller lots; galvanized plain wire, carloads, $2.35; smaller lots, $2.40. Painted barb wire, carloads, $2.45; less than carloads, $2.50; galvanized, carloads, $2.75; less than carloads, $2.80; staples, carloads, $2.30; smaller lots, $2.35; galvanized, carloads, $2.70; smaller lots, $2.75. Bale ties, 82½ and 5 percent discount f. o. b. Waukegan on straight carload lots. Poultry netting, 85 and 5 percent discount from list f. o. b. Joliet or De Kalb with actual freight allowed not exceeding 50 cents per 100 pounds.

Foundry Coke.—There has been a liberal volume of buying in the past week, many melters contracting for their requirements for the first quarter of the year. Frick coke is held firm at $2.65 at the ovens, and other grades of Connellsville coke from $2.35 up at the ovens. New River and Pocahontas range from $4.75 to $5.15 Chicago.

Old Material.—The trading in scrap has been better during the past week than for some time and firmer prices reflect the improved buying. We quote dealers' selling prices, gross tons, as follows:

Old iron rails	$14 00 to 14 50
Old steel rails (mixed lengths)	9 00 to 9 50
Old steel rails (long lengths)	10 50 to 11 00
Relaying rails	23 00 to 24 00
Old wheels	11 50 to 12 00
Heavy melting steel	9 00 to 9 50
Mixed country steel	7 00 to 7 50

The following are selling prices for net tons:

No. 1 R. R. wrought	$10 00 to 10 50
No. 2 R. R. wrought	8 50 to 9 00
Shafting	11 00 to 11 50
Dealers' forge No. 1	9 00 to 9 50
No. 1 busheling and wrought pipe	7 50 to 8 00
No. 1 cast	10 50 to 11 00
Heavy cast (800 pounds and over)	8 00 to 8 50
Agricultural malleable	9 00 to 9 50
Iron axles	14 00 to 14 50
Steel axles	11 50 to 12 00
No. 1 boilers, cut	7 50 to 8 00
Cast borings	3 00 to 3 50
Mixed borings, etc.	3 00 to 3 50
Wrought turnings	6 00 to 6 50
Machine shop turnings	6 00 to 6 50
Iron axle turnings	6 50 to 7 00
Steel axle turnings	6 00 to 6 50
Stove plate and light cast scrap	8 50 to 9 00
Old iron splice bars	10 50 to 11 00

CLEVELAND.

OFFICE OF *The Iron Trade Review*, 1064 ROSE BUILDING, Dec. 22.

The reaffirmation of prices of billets, plates, rails and shapes has had little effect on the market, but, for days preceding the holiday season, business has been very fair. Sellers are very active in working up business and they report indications of a return of confidence and express their conviction that a large amount of business, which has been held up for various reasons, will soon develop into orders. There was keen competition for the contract for structural material for the Rockefeller building, which was awarded at a low figure. The exact estimate of the successful bidder has not been made public.

Iron Ore.—The retrenchment policy of the U. S. Steel Corporation is exemplified in its plans concerning its large fleet of lake vessels. Although a large amount of money might be spent in improvements, especially in adapting some of the older vessels to latest machinery for unloading ore, it has been decided to make no improvements and only absolutely necessary repairs. There has not yet been

any formal discussion as to prices of ore next year.

Pig Iron.—Reports concerning sales of Southern iron are somewhat contradictory. While nearly all sellers are adhering to the $9.50 Birmingham basis for No. 2 and some will not contract beyond Jan. 1 at less than $10, sales have been made at $9.25 and this fact disturbs confidence in the stability of the Southern market, which, last week, seemed to be firm at $9.50. Most of the sales at $9.25 are said to have been of iron high in phosphorus. White iron has sold at $6.75 Birmingham. Evidence accumulates that Northern furnaces will wage an active campaign after Jan. 1 against Southern iron. One large producer has announced its determination to meet Southern prices unless they fall far below present quotations. The usual quotation for No. 2 Northern is $13.50 at the furnace for small lots and 25 cents less for large lots. Inquiries and sales have increased within a few days and the market has a better tone. It is now announced that the contracts for castings for the Pennsylvania railroad tunnel will be let Jan. 20. A prominent foundryman who has been figuring on this work says that the only way the foundries can bid with any prospect of making a fair profit is to make an arrangement with the furnaces which is equivalent to a partnership. The work in this district will be sublet to foundries by an Eastern contractor and foundries complain that the terms of payment are not satisfactory. We quote as follows for Cleveland delivery, save on Northern gray forge, which is at Valley furnace:

Bessemer	$14 00 to 14 50
No. 1 Strong Foundry	14 00 to 14 50
No. 2 Strong Foundry	13 25 to 14 00
No. 3 Foundry	12 75 to 13 50
No. 2 Southern	13 10 to 13 85
Gray Forge, Valley furnace	13 50 to 12 75
Gray Forge, Southern	11 85 to 12 00
Lake Superior charcoal	16 50 to 17 00

Finished Material.—Sales of plates and shapes to the American Shipbuilding Co. and of a considerable tonnage of steel bars at 1.30c for Bessemer and 1.40c for open-hearth, Pittsburg, have been the principal items of a fairly good week. While the recent meetings of steel manufacturers were in progress in New York last week, a number of makers of bar iron met informally and attempted to come to some agreement to maintain prices. It was recognized that it would not be possible to include representatives of all the mills in such an agreement and those present did not urge the making of a price not to be changed under any conditions, but there was unanimity of feeling as to the importance of preventing the price falling below 1.30c at the mill and of influencing the smaller producers, who have been very troublesome, to maintain that quotation. It was conceded, however, that in certain districts it might be necessary to shade the 1.30c quotation. Independent producers of sheets are very active and have recently made some very low prices, indicating a determination to reduce their stock to cash, even at a sacrifice. "Any old price goes on sheets" is the way one large jobber expressed it. Quotations are, to a large extent, nominal. We quote mill sales of black sheets as follows: No. 10, 1.75c; No. 11-12, 1.80c; No. 1[illegible] 1.85c; No. 16, 1.95c; No. 27, 2.30c; No. 28, 2.40c. Galvanized, 75, 10 and 7 off. Out of stock prices are as follows: No. 10, 2.10c; No. 12, 2.15c; No. 14, 2.20c; No. 16, 2.30c; No. 18-20, 2.40c; No. 24, 2.45c; No. 25-26, 2.50c; No. 27, 2.55c; No. 28, 2.65c; No. 30, 3.10c. Galvanized, out of stock, No. 16, 75 and 7½ off; No. 18-20, 75 and 10 off; No. 22-28, 75, 10 and 2½ off.

Old Material.—There is a little more interest, but prices are stationary at low quotations and there are few transactions. Many concerns which are large sellers ordinarily are holding their scrap, hoping for higher prices. We quote the following gross tons, Cleveland:

Old iron rails	$15 00 to 16 00
Old steel rails (over 6 feet)	10 00 to 11 00
Old steel rails (6 feet and under)	11 00 to 12 00
Old car wheels	13 00 to 14 00
Steel boiler plates	9 00 to 10 00
Malleable iron (railroad)	11 00 to 12 00
Malleable iron (agricultural)	9 00 to 10 00
Heavy steel	9 00 to 10 00

We quote the following net tons:

No. 1 R. R. wrought	$11 50 to 12 00
Mill scrap	9 00 to 10 00
No. 1 machine cast scrap	10 00 to 11 00
Iron axles	14 00 to 15 00
Axle turnings	9 00 to 10 00
Wrought turnings (free from cast)	6 00 to 7 00
Uncut wrought iron boilers	5 00 to 6 00
Grate bars	6 00 to 7 00
Pipes and flues (clean)	8 00 to 9 00
Tank iron	8 00 to 9 00
Hoop and band iron	5 00 to 6 00
Sheet iron	4 00 to 5 00
Wrought drillings	6 00 to 7 00
Stove plate	8 50 to 9 00
Steel axles	13 00 to 14 00
Cast borings	2 50 to 3 00

CINCINNATI.

Dec. 22.

The coke market continues quiet and easy in tone, with quotations for foundry coke ranging from $2 to $2.40 f. o. b. ovens. The pig iron market is somewhat less active, but not materially changed. In the finished lines there is no change in the situation and trade is quiet, but shows some improvement in demand.

Pig Iron.—There has been a less active market the past week and the tone of the situation is slightly easier. The going price is still $9.50, Birmingham, but there have been a few transactions at the equivalent of $9.25, Birmingham. These sales are said to have been made by furnaces so situated that favorable freight rates made it possible to net $9.50 at furnace. There has been less inquiry for large lots, with only one sale for a round lot reported. This was made to an Ohio manufacturer and covered deliveries running over the second half of next year. About 5,000 tons was taken, part Northern and part Southern iron. Some of the Southern iron was on the $9.50 basis, first quarter deliveries, and the Northern iron was said to have been on the basis of $14.50, delivered, deliveries running into the second half of 1904. Northern iron is easier in tone, with furnace interests showing more disposition to sell than in the past several weeks. The advices from the Southern producers are all of a tenor to indicate a strong feeling in that quarter. They are not inclined to quote prices for deliveries into the second half of the coming year. On such inquiries $10, Birmingham, is the ruling figure. Prompt shipment iron is more likely to bring out inside prices than even first quarter deliveries. It is reported that some important Southern producers are sold up through the first quarter. The feeling is that there will be less activity now in the market until after the first of the year. Current prices are:

Southern Foundry No. 1	$12 75 to 13 00
Southern Foundry No. 2	12 25 to 12 50
Southern Foundry No. 3	11 75 to 12 00
Southern Foundry No. 4	11 25 to 11 50
Southern Foundry No. 1 soft	12 75 to 13 00
Southern Foundry No. 2 soft	12 25 to 12 50
Gray forge	10 75 to 11 25
Northern Foundry No. 1	15 15 to 15 40
Northern Foundry No. 2	14 65 to 15 15
Northern Silvery (8% silicon)	17 15 to 17 65
Southern car wheel iron	18 75 to 19 00

Finished Material.—Dealers report a more active inquiry and a better tone to the market, but admit that the sales are still for conservative quantities. There have been no price changes. For bar iron a quotation of 1.25c Cincinnati is obtainable on car loads. Steel bars are quoted 1.43c base, half extras, with the retail price 1.75c for iron and steel out of store. Galvanized sheets are being quoted at 75 and 10 and 5 and 2½ percent off. We quote black sheets, No. 27, at 2.45c in car lots of 500 bundles. Black sheets out of store are selling as follows: No. 28, 2.90c; No. 27, 2.80c; No. 16, 2.55c; No. 14, 2.45c; No. 12, 2.35c; No. 10, 2.30c. Tank plates are easy and sell out of store at 2c for ¼-inch and 2.10c for 3-16-inch. Beams and channels are quoted at 1.90c to 2c from stock, and angles at 1.90c to 2c for base sizes.

In merchant pipe the independent mills are still underselling the leading interest, but the latter is still maintaining prices as independent mills are not in position to furnish orders for miscellaneous sizes, and this gives the large producers an advantage. The market is not quotably changed:

MERCHANT PIPE.
(Basing Discounts.)

	Steel Pipe.		Guaranteed. Wrought Iron Pipe.	
	Black. Percent.	Galv. Percent.	Black. Percent.	Galv. Percent.
⅛, ¼, ⅜ inch	66.7	56.7	63.7	53.7
½ inch	65.7	58.7	65.7	55.7
¾ to 6 inch, inclusive	73.7	63.7	70.7	60.7
7 to 12-inch, inclusive	67.7	57.7	64.7	54.7

BOILER TUBES.

	Steel Percent.	Iron Percent.
1 to 1½ inch	41.2	37.7
1¾ to 2½ inch	54.2	36.7
2¾ to 5 inch	59.7	46.7
6 to 13 inch	54.2	36.7

Old Material.—The market is quiet and unchanged, with dealers buying as low as they can and holding for a better situation. This makes prices irregular and unsettled. We quote:

Old No. 1 railroad wrought, net tons	$10 00 to 10 50
Cast machine and foundry, net tons	10 50 to 11 00
Old iron rails, gross tons	16 00 to 17 00
Old steel rails, gross tons	12 00 to 13 00
Old short lengths, gross tons	10 00 to 11 00
Old iron axles, net tons	15 00 to 15 50
Stove plate, net tons	9 00 to 9 50
Wrought turnings, net tons	6 00 to 6 50
Cast borings, net tons	4 00 to 5 00

The LaFollette Coal, Iron & Railway Co. has just installed a new blowing engine and put up a new hot blast stove, making the fourth new stove, and has made other considerable improvements. The furnace will blow in this week with a capacity of 300 tons a day. The Field-Evans Iron Co., of Cincinnati, is selling agent.

It is authoritatively stated that on Jan. 1, 1904, the Domhoff & Joyce Co. will be reappointed sales agent for the Virginia Iron, Coal & Coke Co. in the territory it covered prior to Feb. 1 of this year, which includes the eastern half of Indiana and Michigan, all of Ohio, and the Pittsburg territory.

PHILADELPHIA.

Dec. 22

The reaffirmation of prices by steel manufacturers caused some disappointment among buyers. Orders for finished material are scarce and few, if any, of the mills are making more than half time. Opinions differ as to whether reduced prices would result in more business. Many manufacturers are confident that conditions will be improved in the near future.

Pig Iron.—The demand is fair and prices are not lower. Recent purchases have caused a more optimistic feeling, although heavy transactions are not expected to take place until after the holidays. Prices are firm, at about the following quotations for Philadelphia and nearbv deliveries: No. 2 X foundry, $15 to $15.50; No. 2 plain, $14.25 to $14.75; standard gray forge, $13.75 to $14; ordinary gray forge, $13 to $13.50; Southern No. 2 X rail shipment, $13.75 to $14; Southern No. X on dock, $13.25 to $13.50.

Finished Material.—The demand has been very light, awaiting action at the New York meetings, and there has been little change since those meetings. Mills are sorely in need of orders. We quote: Plates, ¼-inch and thicker, 1.75c to 1.80c; beams, angles, channels, 1.75c to 1.80c; small angles, 1.50c to 1.60c; steel bars, 1.45c to 1.50c; refined iron, 1.40c to 1.45c.

Old Material.—The market is dull at unchanged prices, with full supplies. We quote: Old steel rails, $11.50 to $12; miscellaneous heavy steel, $11.25 to $11.50; old steel axles, $14 to $15; old iron axles, nominal, $16 to $17; old iron rails, nominal, $15 to $16; old car wheels, nominal, $13 to $14; choice railroad No. 1 wrought, $14 to $14.50; country scrap, $12.50 to $13; machinery cast, $13 to $13.50; No. 2 light scrap, forge, $11 to $12; No. 2 light scrap, ordinary, $9.50 to $10; axle turnings, $10 to $10.50; wrought turnings, $8.75 to $9.25; wrought turnings, choice heavy, $9.75 to $10; cast borings, $6.25 to $6.75; stove plate, $9.75 to $10.25; wrought iron pipe, $10 to $11; boiler punchings, $15 to $16.

NEW YORK.

OFFICE OF *The Iron Trade Review*,
ROOM 1909, No. 150 NASSAU ST., Dec. 22.

The meetings of the various steel interests in this city last week, which began on Tuesday, resulted in the reaffirmation of all price schedules. The sessions comprised billet, plate, structural material, bar iron, shafting and bolt and nut manufacturers. Contrary to many reports, the rail pool did not convene. The bar iron men decided to continue the restricted output plan agreed upon several weeks ago.

Pig Iron.—Selling agents here report their sales during the past week to have been as large as in the week previous, and altogether a good tonnage has been placed. Nearly all the contracts closed were for Southern iron, the undertone to which was not as strong as a fortnight ago. One leading interest is still selling Southern No. 2 foundry on the basis of $9.25, Birmingham, for any delivery, while another large company has been ready to book orders for delivery any time during the first three months of the new year at $9.50. Less than a week ago this company was holding out for $9.75 for March delivery. The transactions comprised from 25 to 500-ton lots, but the average sales rarely went above 100 tons. While a great deal has been said about buyers believing the bottom to have been reached, and purchasing in conformity with that opinion, no evidence is obtainable here to justify these statements. There are some good authorities who look for a continuance of the hand-to-mouth buying policy for at least several weeks to come, although believing that the tonnage placed in the meantime will gradually grow larger. The inquiries received during the past week were less for extended shipment than those for the week prior, for which some thought the season was entirely responsible. Activity in Northern irons still continues moderate, and prices show no change. New York pig iron prices are as follows: Northern No. 1 X, $15.25 to $15.75; No. 2 X, $14.50 to $15.50; No. 2 plain, $14.25 to $15; Southern No. 1 foundry, $13.25 to $13.75; No. 2 foundry, $13 to $13.25; No. 3 foundry, $12.25 to $12.75; No. 4 foundry, $11.75 to $12.25.

Finished Iron and Steel.—Following the announcement of the reaffirmation of prices the structural material situation took on a very encouraging aspect. Yesterday the American bridge Co. booked a 1,000 ton order, that had been held back pending the meeting of structural material manufacturers. The company, since the meeting in question, has also received assurances that propositions aggregating some 70,000 tons, which would have been placed several weeks ago but for the talk of lower prices, will be closed early after the opening of the new year. The resolution to maintain plate prices has not resulted in any notable developments yet, but mill representatives believe that it shortly will. Sheets are in poor demand, and prices have suffered a slight decline since we last quoted them, especially in blacks. The bar iron market has not improved, and buyers are dictating terms. New York prices are as follows: Beams and channels, 15 inches and under, 1.75c to 1.90c; angles, 3 to 6 inches, 1.75c to 1.90c; zees, 1.75c to 1.90c; bulb angles, 2.05c to 2.35c; deck beams, 2.05c to 2.25c; sheared steel plates, tank, 1.75c to 1.80c; flange, 1.85c to 1.90c; firebox, ordinary, 1.95c to 2c; refined iron bars, 1.40c to 1.45c; soft steel bars, 1.40c to 1.50c; steel sheets, in carloads, New York, No. 28 black, 2.45c to 2.55c; galvanized, 75 and 10 to 75 and 5 off.

BIRMINGHAM, ALA.

Dec. 22

With $9.50 for No. 2 foundry iron generally maintained in the past ten days, predictions are heard that $10 will in a very short while be the minimum figure at which iron can be had in this district. Rumors are again current as to a revival of the pig iron association which was disrupted early in October, but there is little prospect of any material results along this line just now. Stocks of iron are being reduced as fast as cars are obtainable, while the production is somewhat lighter. It is announced that No. 3 furnace of the Republic Iron & Steel Co., the company's newest stack, will go out this week. No. 1 furnace is out now, undergoing repairs, but will likely be blown in before a great while. Meantime, No. 3 will be generally overhauled. The Woodstock Iron Works, owning two furnaces at Anniston, one of which has been in operation for quite a while, closed down entirely the past week, putting a stop to their ore and coal mining operations. The coke used by this furnace came from the mines of the Milner Coal & Railroad Co. at Newcastle, a few miles north of Birmingham. As a result of the suspension of the Woodstock furnace, these coal mines have been closed. If the market improves, the furnaces now out will likely resume; but such improvement will have to be material. No one familiar with the manufacture of iron in the district

under present conditions as to labor, etc., will admit that it is profitable to undertake to produce and sell at less than $10 for No. 2 foundry, as this would mean an average of, say, $9.50, from which there would be deducted commissions, etc., leaving from $9 to $9.25 for the average output of the furnaces. Some slight reduction has been made in day labor at the different plants, but furnace labor proper remains unchanged. After the close of the present year, it is expected these wages will be reduced at least 10 percent, although the demand for labor from various sources prevents the reduction that the iron situation seems to demand. There is quite a lot of railroad construction under way, and common labor is receiving the same wages as prevailed a year ago. But with more furnace stacks out of commission, the problem of reducing wages will solve itself. We quote as follows:

No. 1 Foundry	$10 00 to 10 50
No. 1 Soft	10 00 to 10 50
No. 2 Foundry	9 50 to 10 00
No. 2 Soft	9 50 to 10 00
No. 3 Foundry	9 00 to 9 50
No. 4 Foundry	8 50 to 9 00
Gray Forge	8 25 to 8 50
Mottled	8 00 to 8 25
Alabama car wheel, all grades	16 00 to 17 00

With the advent of the holiday season the coal mines are being taxed to fill orders to tide over the expected shutdown period. However, the miners announce today that they expect to work until noon of the 24th and then resume operations on the 28th. Coke shows some improvement in demand, with good inquiry from the smelters in the West and Southwest.

The Metal Market.

NEW YORK.

OFFICE OF *The Iron Trade Review*,
ROOM 1909, NO. 150 NASSAU ST., Dec. 22.

Pig Tin.—The local tin market was completely under the domination of London during the week, where bullish operations were highly successful. As a result spot here is up about ¾c per pound, as compared with a week previous, while spot in London advanced £2 during the same period. The situation in the East was stronger also. There cannot be said to be anything in the trade domain to justify these developments, unless it be a scarcity of spot—but on sentimental reasons the market always is buoyant at this time. Closing prices at the Metal Exchange today were as follows: Spot, 28½c; December, 28 to 28½c. London's closings today follow: Spot, £129;; futures, £130. Arrivals at Atlantic ports for the month to date aggregate 735 tons, with 2,565 tons afloat.

Copper.—The "official" prices remain the same as a week ago, but reports from trade circles agree that business is exceptionally dull. The market is a narrow one all around, and while Wall Street pictures the outlook as very hopeful, there is nothing in either recent sales or inquiries, to sustain it. The London market during the week has been very dull, and prices for both spot and futures have declined. The closing prices at the Metal Exchange today were as follows: Lake, 12⅜c to 12⅝c; electrolytic, 12¼c to 12½c; casting, 12⅛c to 12⅜c. London's closings today follow: Spot, £56 15s; futures, £56 7s 6d. Exports for the month to date aggregate 9,481 tons, against 6,687 tons for a similar period last year.

Lead.—Spot is scarce and strong, and sells at 4⅜c. St. Louis is unchanged at 4.17½c, while London is slightly lower at £11 3s 9d.

Spelter.—Is in good demand, with spot easier at 5c, and December slightly higher at 4.85c. St. Louis is stronger at 4.60c, and London advanced to £21 7s 6d.

Antimony.—Cookson's is 7¼c, Hallett's 6¼c, and outside brands 5¾c.

Quicksilver.—Is quoted at $46.50 to $47.50 per flask of 76½ pounds in lots of 100 flasks. London is £8 5s.

Nickel.—Is selling at 40c to 47c for large lots down to a ton, and 50c and 60c for smaller quantities.

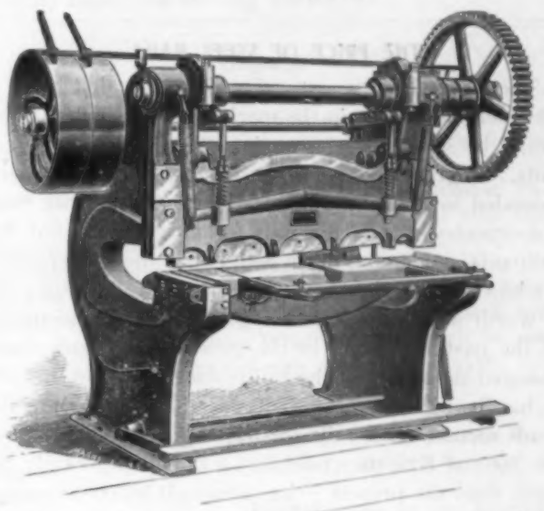
The Bessemer plant of the Buffalo Iron & Steel Co., Youngstown, O., will resume operations next week.

NEW SHEAR FOR LIGHT PLATES.

The illustration shows a new shear which is made from 4 to 6 feet long for material from 12 gauge to ¼ inch. It has been designed especially to meet the requirements of shops that do not have use for a regular mill or heavy plate shear. The automatic clamp is operated by a cam providing ample travel so as not to interfere with handling the plates, and having half round openings in the bottom edge, the shearing line can be seen at all times. The bearings are extra large. The gears and shafts are very heavy, and being a deep throat machine (the throat can be made any depth required up to 24 inches) it is preferably made with overhead drive so that the gears and shafts are out of the way.

The clutch is the positive four-jaw type, with steel-faced jaws, and is of simple construction, without triggers or springs. The table has a patented adjustment of convenient and accurate type. A gang punch bar attachment can be furnished with the shear and by means of this device converted into a combined shear and gang punch. The punch bar is arranged to disengage and lock independently in a few seconds; therefore, the shear can be used as a regular shear or as a gang punch, or combined, as desired. All regular front and rear brackets, gauges for trimming, slitting and squaring, are furnished.

The shear is of simple construction, very heavy throughout, and built for continuous use for the specified capacity.



Nearly twenty-five years' experience as manufacturers of this class of tools has had due effect upon the general design. The shear is built by Bertsch & Co., of Cambridge City, Ind.

Messrs R. & W. Hawthorn Leslie & Co., Ltd., of Hebburn-on-Tyne, have received an order to build a high-speed turbine boat for service on the Great Lakes, which is to carry between 1,500 and 2,000 passengers. A careful study has been made by the firm of the respective merits of the newer French and American steam turbines, as compared with the Parsons' type, with the result that the last-named is to be fitted.—[London Engineering.

The Pennsylvania railroad has no plans for a structural steel plant at South Altoona, Pa. Its new foundry plant is the only operation under way or contemplated at that point.

The Loomis-Pettibone Gas Machinery Co. has recently opened the following branch offices: Boston, State Mutual building; Pittsburg Farmers' Bank building; Chicago, First National Bank building.

The Durable Wire Rope Co. has leased for a term of years the remodeled stores, Nos. 26-30 Atlantic avenue, at the head of Lewis wharf, Boston, and has occupied the new location since Dec. 1.

THE IRON TRADE REVIEW

Devoted to the Machinery, Metal-Working and Foundry Trades and Iron and Steel Manufacture.

PUBLISHED EVERY THURSDAY BY

THE IRON & STEEL PRESS CO.

ROSE BUILDING, CLEVELAND, OHIO.

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JOHN A. PENTON, Vice-President,
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PITTSBURG: 429 Park Building, A. O. BACKERT, Manager.
NEW YORK: 150 Nassau St., D. C. WARREN, Manager.
THE CENTRAL WEST: R. A. EVANS, Manager.

Subscription, $3.00 per annum. To Foreign Countries, $4.00.
Advertising Rates Furnished on Application.

The Cleveland News Co. will supply the trade with THE IRON TRADE REVIEW through the regular channels of the American News Co.

ENTERED AT THE POST OFFICE AT CLEVELAND, O., AS SECOND CLASS MATTER.

DECEMBER 24, 1903

THE PRICE OF STEEL RAILS.

There has been a natural expectation that with a considerable decline in the market price of billets there would be some lowering at least in the price of steel rails. A great deal of newspaper sympathy has been extended to the railroads on account of the price they are expected to pay for rails for next season, but the railroads understand much better than their sympathizers how cheaply they have really secured their rails. It is worth while to recall how greatly the developments of the past few years in the general steel trade have changed the aspect of the rail replacement problem. It is hardly necessary to point out that while the railroads secured their rails for 1902 and 1903 at $28, and for 1901 at $26, they paid $35 for their 1900 rails, $7 more than the present price, although billets averaged in that year a figure below the present market. Such a statement merely amounts to saying that the railroads ought to be glad they are not as unlucky as they were in 1900. It is also scarcely worth while to argue that as rails used to average a few dollars above billets in years gone by, while last year they were cheaper than billets, the railroads ought willingly for next year to pay a price several dollars a ton above the billet market, since that is simply an expression of the idea that the railroads owe the rail mills a sentimental debt, which could now be gracefully expressed and paid in dollars.

Arguments like the above are hardly germane to the purely business problem of a railroad management contemplating the purchase of rails, a problem naturally to be considered rather on its present merits than in the light of alleged wrongs or rights in the past.

Ten years ago rail replacement involved putting down much heavier rails than those taken up, and selling the great bulk of those taken up as scrap, in a well supplied market. It was very far from a case of a new ton for an old one. The railroad manager's view of the case then was that the road did well if it came within $10 a ton of getting the same price for a ton of old rails as it paid for a ton of new ones. The extra tonnage of new rails required was purely a new investment. Several factors have since intervened which have entirely changed the complexion of affairs.

One of these factors is that the roads of the country have in general been brought so near the present standard that the rails taken up are but little if any lighter than the new ones put down. It is now nearly ton for ton. Another is found in the great rise of the basic open-hearth steel industry, which has originated the dictum, even though it is subscribed to by none but those who have scrap to sell, that heavy melting scrap is worth 15 percent more than Bessemer pig. The wide adoption of the basic open-hearth process has at least greatly enhanced the market value of scrap rails.

A more important influence than this is the rise of the rerolling process, whereby at a cost of a very few dollars a ton an old rail is converted into a merchantable one, available for many purposes. This industry is the growth of but a very few years, and thousands of tons of its product last year sold at a considerable advance over the standard rail price. The heavier loads and greater speeds now the rule with railroads make it necessary for them to take up rails which are in comparatively good condition. The railroads profit by giving the rails a short life, or they would not do it. The result is that if conditions demanded, all but a small proportion of the weight of track taken up, say between 15 and 25 percent, is available for either rerollers or relayers. The old rail material from a standard track contains little outside of guard rails and frogs which cannot be utilized as rerolling or relaying rails.

All this has given rise to such anomalies as occurred in 1899, when the roads obtained more per mile for their old material than they were paying for the new rails. In the years 1901 and 1902 they obtained very nearly as much. In the summer of 1902 the railroads received, say, $21 for 25 percent scrap, $24 for 50 percent rerollers, and $28 for 25 percent relayers, an average of $24.25, just $3.75 below the price of new rails. Surely this was a small price to pay, and many roads had a narrower margin for a considerable period. Even at a time of very wide spreads like the present, when scrap is a drug, when there are more rerollers than the rerolling mills will buy, and when there is comparatively little demand for relayers, conditions have scarcely reached the old principle of a $10 spread between new and old material.

For five years past, it is pretty safe to assert that the railroads have not had to pay out as much as five new dollars per ton for their rails. What they have had to pay on account of heavier sections is little, and in any event is purely a new investment which will not again be required.

THE COTTON TRADE AS A FACTOR.

The connection between the cotton and steel industries is more intimate than appears upon the surface. Cotton, being one of our principal produce crops, contributes largely to the welfare of a large section of the country. It is not only the people of the South who derive direct benefit from the marketing of cotton but thousands of operatives throughout New England and in other manufacturing States are directly dependent upon the growth and distribution of this

great staple, so that anything interfering with its normal course would have a deep and widespread influence for harm.

It is to be remembered that while wheat, corn and hay are equally important in domestic trade, cotton holds first place in export traffic. Whatever diminishes the purchasing power of the people exerts a direct influence upon the iron and steel industry, and cotton is the basis of prosperity throughout the South and the great Southwest, where bale ties, nails and wire, to say nothing of machinery in various forms, are being consumed in larger quantities from year to year.

Recently the attention of the entire commercial world has been centered upon developments in the cotton industry, eclipsing even for a short time the importance of export trade, transportation rates and wage adjustments in the steel industry. On the day the preliminary official estimate of the 1903-04 crop was published from Washington the volume of trading on the New York Cotton Exchange exceeded that of any day in its history, fully one-fifth of the estimated crop of the present season changing hands. Fluctuations in prices were almost as great as during times of great panic. But the advance at New York was less than at New Orleans, where the paper appreciation of raw cotton was little less than one cent per pound during the single session, and the English markets were scarcely less excited and strong, with rapid advances.

The Agricultural Department estimates the cotton crop for the present season at 9,962,039 bales, of an average weight of 490.8 pounds per bale. The Bureau of Statistics of the Commerce and Labor Department estimates that this is equivalent to about 10,250,000 commercial bales, and these figures seem to be verified by the ginning estimates of the Census Office which have been made up to Nov. 14. From these figures it would appear that 69 percent of the total crop has already been ginned, which is practically the same as a year ago. The area picked or to be picked this season is estimated at something over 28 million acres, or, a reduction of about 3.09 percent from the acreage planted.

These developments make it evident that the cotton industry of this country, which has already suffered seriously for months, because of reprehensible speculative dealings, which have interfered with the normal course of the staple, is likely to be further disturbed by similar piratical practices. It is known that the usual floating surplus has been almost entirely eliminated, affording speculators even better opportunity than last year for manipulating the price of the product through the marketing of the crop from the plantations to the mills. There can be little doubt indeed that damage will be done not only to the cotton manufacturing industry but export trade will be injured and additional stimulus be given to the production of cotton in other parts of the world, detracting from our present pre-eminence as producers.

It should be noted that while the crop has fallen away about 10 percent from the high record of production, the price has risen about 50 percent above the normal level. The available supply of raw cotton will undoubtedly fall far short of the quantity required by the demand which has been developed in recent years. The price, however, is not wholly controlled by that relation of supply and demand, but is the result rather of speculative manipulation. There is a limit at which cotton cloths and other manufactured goods will go into consumption, and the price of raw cotton is dependent upon this limit. Manufacturers of cotton goods have already curtailed production and a further contraction in output seems inevitable.

The fact is already evident that finished goods cannot be sold at a price that will give a profit to manufacturers at the present market price of raw material and wages paid to labor. The consumption of cotton has increased enormously in the last generation because it has been relatively cheap, but consumption can and will be greatly diminished as the staple ceases to be readily available at low prices.

There is already a public sentiment against the manipulation of the markets for our great staple crops upon which the prosperity of the entire country is founded to a great extent, and this spirit of antagonism should not only be fostered but intensified with the end in view of discouraging interference with normal trade currents. It is especially necessary in a time like the present, when the country is facing depression in many important lines of industry.

Obituary.

James F. Yeats, aged 76 years, died Dec. 10 at his home in Owosso, Mich. Mr. Yeats was a pioneer foundryman and manufacturer of windmills, and was a member of the firm of Yeats & Osborn.

Col. H. M. Boies, a prominent citizen of Scranton, Pa., died Dec. 11, aged 67 years. In the spring of 1882 Col. Boies became president of the Dickson Mfg. Co., which position he held for four years during which the company enlarged its plant and introduced the hydraulic system of flanging and riveting. He invented a steel-tired car wheel, now manufactured by the Boies Wheel Co., of which he was president. He was identified with a number of social, religious and charitable institutions.

Paul Richter, president of the Richter Iron Works Co., Denver, Colo., was accidently shot and killed Dec. 13, by a companion, with whom he was on a hunting trip east of Denver.

E. G. Angell, for many years president of the American Screw Co., died Dec. 16 at his home in Providence, R. I.

W. H. Davol, senior member of the firm of John Davol & Sons, died Dec. 15 at his residence in Brooklyn. Mr. Davol was very prominently identified with the metal trade of that city.

Thomas Cyprian Frenyear, sales manager of the new Canadian Westinghouse Co., died of typhoid fever at Fort William, Can., on Dec. 10. He was a man of exemplary life, unusual business judgmemt and ability, and was remarkable for the clearness and force of his ideas. Mr. Frenyear was born March 16, 1865, at Middletown Spa, Vt. He graduated from Phillips Exeter Academy in 1885. For several years after that he was in the employ of the Thomson-Houston and Brush Electric companies as a salesman. In the fall of 1895 he entered the employ of the Westinghouse Electric & Mfg. Co. He was connected with the sales office of that company until Nov. 1, 1903, when he was placed in charge of the sales department of the new Canadian company, with headquarters in Toronto.

The Youngstown Iron, Sheet & Tube Co., of Youngstown, O., in a circular to the trade, officially denies the report that has been circulated of late of that company selling out to the Republic Iron & Steel Co. It states that, having its own ore mines, coal and coke properties, blast furnaces, puddle mills, muck bar mills, sheet mills, skelp mill and pipe works, it is entirely self-contained and independent and will continue so.

ALABAMA CONSOLIDATED COAL & IRON CO.

The fourth annual report of the Alabama Consolidated Coal & Iron Co. has just been published. It is dated Dec. 1, 1903, and covers the year ending Oct. 31, 1903. The report is interesting as reflecting the condition of the Southern iron trade in the period named. The statement of assets shows property account of $4,711,231.49; improvements, $1,519,646.56; iron on hand, $164,789.25; accounts and bills receivable, $149,392.33, and other items, making a total of $6,738,144.77. The capital stock is $2,500,000 each of preferred and common. Below is the statement of income account for the year ending Oct. 31, 1903, also the profit and loss account for the same period:

INCOME ACCOUNT FOR THE YEAR ENDING OCT. 31, 1903.

Gross earnings—	
Iron sales	$1,337,451 15
Coke sales	720,550 35
Coal sales	568,654 18
Store sales	474,491 00
Rents collected	50,921 52
Saw mills	16,416 38
Miscellaneous	11,848 00
Total	$3,180,332 58
Less operating expenses, taxes and other expenses	2,566,913 76
Net profits	$613,418 82

PROFIT AND LOSS ACCOUNT FOR THE YEAR ENDING OCT. 31, 1903.

1902.		
Nov. 1, By balance		$377,607 35
Dec. 31, By profit on sales treasury stock		2,335 75
1903.		
Oct. 31, By net earnings for the year		613,418 82
1902.		
Dec. 1, To dividends on preferred stock	$43,750 00	
1903.		
March 1, To dividends on preferred stock	43,750 00	
June 1, To dividends on preferred stock	43,750 00	
June 30, To New Jersey State tax	4,000 00	
Sept. 1, To dividend on preferred stock	43,750 00	
Oct. 1, To dividend on common stock	54,000 00	
To depreciation in value of iron on hand to reduce same to market value	44,106 56	
By balance	691,275 36	
	$993,361 92	993,361 92

From the report of President T. G. Bush we take the following:

"The furnaces at Ironaton were in continuous operation during the fiscal year with the exception of 19 days for No. 1 furnace and 13 days for No. 2 furnace, due to the strike of the coal miners in July, stoppage for repairs and other unavoidable causes. There were frequent interruptions in the operation of both furnaces during the year on account of the construction work, installing new engines and boilers, building new stove, etc. Notwithstanding these interruptions the two furnaces produced during the year 70,108 tons, as against 61,244 tons for the previous year. The construction work at Ironaton was done with a view of bringing the furnaces to an output equivalent to their normal capacity. I am pleased to report that this has been attained. These furnaces now are producing 250 to 275 tons per day, or on a basis of 85,000 tons per annum, allowing say 30 days in the year for repairs, etc.

"The Gadsden furnace was operated from the beginning of the fiscal year to June 23, 1903. Reference was made in the last report to a new furnace being under construction. This furnace was promised by the contractors by the first of January, 1903, but they failed in their promise, and the delay in completing the work prevented the blowing in of the stack before the last of August. The old furnace was blown out June 23 for the purpose of making connections with the new stack, the blowing in of which was delayed particularly on account of the strike of the coal miners in July. The new furnace has met our expectations in every respect, and in every way appears to be one of the best, if not the most modern furnace in the Southern district. It is showing a capacity of 225 to 250 tons per day, and has caused a great reduction in the cost of iron. We have reason to expect an annual output from this furnace of 75,000 tons, making a total product of the three furnaces of about 160,000 tons per annum. The cost of this furnace exceeded our original estimates, due to decision to increase the blowing power and boiler power so as to avoid any possible weakness or deficiency in those departments. Besides, our storage bins in connection with the skip hoist were built on a more extensive and substantial plan than first contemplated. It is felt, however, that the investment will prove a most valuable one in the future operations of the company.

"All of the mines of the company have been in continuous operation except when shut down on account of the strike by the coal miners in July last. It was difficult to resume with a full output of the mines as soon as the strike was ended, but our total output for the year shows 518,623 tons, as compared with 475,166 tons the previous year. The mines are better equipped and are in better condition than they have been at any time in the history of the company, and with a normal demand for coal and coke they could be brought to an output of 650,000 tons a year without material additional improvements.

"The coke ovens at the different plants were operated in connection with the mines during the year with some reduction in their minimum output, due to the same causes which restricted the output of coal. We produced during the year, however, 207,803 tons of coke, as against 200,597 tons the year previous. However, we did not receive any benefit in output from one hundred new ovens which were constructed at our Lewisburg mines during the year, but not put in service. These new ovens, added to those already existing, make a total of 765, with a yearly capacity of 250,000 to 275,000 tons of coke.

"The capacity of our ore mines has been very much increased to meet the increased demand caused by the erection of the new furnace at Gadsden. In developing these mines to a greater capacity we were at the expense of additional houses for the miners, as well as for various kinds of machinery. The output of the red ore mines has been increased nearly 50 percent, if not quite that much. We have also increased our resources for brown ore at Ironaton by the erection of additional washers and pipe lines, all of which have, of course, involved more or less expense. The improvements at the limestone quarry have been completed, and have not only increased the capacity to more than our needs, but greatly reduced the cost of the crushed stone. These improvements make this quarry probably the best in the State, and will save the company in cost of the limestone something like $15,000 per annum.

"The improvements which we have made, as already referred to in a general way, include the building of a new modern furnace at Gadsden, equipped with the most modern machinery and labor-saving appliances, making this furnace up to date and equal to the best in the South—the skip-hoist alone reducing the number of laborers in the stock house filling the furnace from twenty-five men to three. The improvements at our furnaces at Ironaton were in the way of additional blowing engines, boilers, new stove for No. 2 furnace and additional water pipe lines, pumps, ore washers, etc. At our coal mines additional houses needed for accommodating the miners, some additional machinery, larger bins for coal at the Searles mines and additions to the washers at that place; installing coal cutting machines in our Lewisburg mines, with all necessary machinery, including compressors, pumps, etc.; construction of one hundred new coke ovens at Lewisburg; additional houses and machinery for the red ore mines at Attalla, and similar improvements to a less extent for the red ore mines at Gadsden.

"It will be remembered that we have been passing through an era of construction since the organization of the company, absolutely necessary to bring the property to its present state of development and producing capacity. While these improvements have required a very large outlay, they have greatly increased the strength of the company. Our situation as to our capacity and resources sums up as follows:

"Three furnaces with capacity of 150,000 to 180,000 tons of iron per annum.

"Coal mines with a capacity of 600,000 to 650,000 tons per annum.

"Seven hundred and sixty-five coke ovens with a capacity of 250,000 to 275,000 tons of coke per annum.

"Ore mines with full capacity for the furnaces.

"Limestone quarry with ample supply of flux for our furnaces and also furnishing a large quantity of stone for sale.

"There has recently been sold a piece of unproductive

property known as the Mary Pratt property, in Birmingham, not needed in the company's operations, for $80,000, which will shortly be paid for.

"In keeping with our custom or rule, we set aside during the year 25 cents per ton of iron made as a reserve fund for prospective repairs to furnaces. We have charged the usual royalty on ore and coal mined, and have also made a monthly charge for general depreciation. The amounts carried to the credit of prospective repairs have been applied to improvements made on the furnaces, as indicated in tabulated statements hereto attached. This statement also includes the depression and royalty accounts.

"The price of iron began to decline about March 1, and the decline became so rapid and pronounced that consumers refused to buy for their needs for the last half of the year, and would only buy for the first half to cover contracts in hand. These conditions became more acute as the year advanced, so that the iron companies found themselves on July 1 not only without orders for the last half of the year, but with a very large tonnage of iron due on orders help up by request of buyers which should have been shipped previous to that time. The history of the iron market from July to the present time is well known to all. There has been a large reduction in the output of the furnaces of this country within the last 60 days, but consumption has been so small, comparatively, that buyers have not been inspired with great confidence, even when they had reason to believe they could buy iron for less than cost. This very rapid decline to such a low point gives encouragement to believe that a reaction will take place earlier than when the decline is more gradual and covering a longer peried. Just what the outcome will be it is difficult to say, but it is reasonable to suppose that labor and the cost of supplies must be adjusted to the present value of iron or the production must be greatly curtailed.

"It is the policy of the directors to continue the operation of the furnaces, endeavoring to produce iron at the lowest possible cost; but they will, of course, be guided in their action by future developments and conditions. It is fair and reasonable to say, however, that the properties of this company are in a condition for it to avail itself of all favorable opportunities that may be presented to the extent of having its mines and furnaces in a first-class physical condition."

Inland Steel Co.'s Wage Scale.

(Special Telegram.)

PITTSBURG, Pa., Dec. 23.—At the meeting of the advisory board of the Amalgamated Association held yesterday it was suggested that the employes of the Inland Steel Co., Indiana Harbor, Ind., affiliated with this organization, accept the company's proposed reduction from the Amalgamated wage scale contingent upon its restoration when business conditions improve.

The National Rolling Mill Co., which is removing its plant from Hartford City to Vincennes, Ind., expects to be in complete operation in the new location by Jan. 1.

W. H. Armstrong has been appointed receiver of the Phœnix Foundry Co., of Ripley, O. This concern was operated profitably by the late John P. Parker. After his death the business was continued by his widow until a short time ago.

The offer of Nelson S. Hunter, of Wabash, to buy the plant of the Wabash Bridge & Iron Co., now in bankruptcy, has been rejected by the creditors. Hunter offered to pay $60,000 for the plant, paying $10,000 down.

Two of the rolling mills of the Susquehanna Iron & Steel Co., Columbia, Pa., have been put in operation. The other mills will very likely start as soon as the inventory of property is finished.

PERSONAL.

Edward P. Corey, who has held a responsible position with the National Tube Co. at McKeesport, Pa., for some time, has been appointed general manager of the company's new plant at Lorain, O. Mr. Corey is a nephew of President Corey, of the United States Steel Corporation.

George E. McCague, who recently resigned as traffic manager of the Carnegie Steel Co., and who at that time was chief of the traffic managers of the subsidiary companies of the United States Steel Corporation, was presented with a silver loving cup at an informal banquet given in his honor at New York on Wednesday, Dec. 16. The following were in attendance: W. B. Dickson, Charles S. Belstering, F. T. Bentley, T. C. Bihler, D. N. Bates, John S. Keefe, F. E. Leanerd, John Masterson, A. F. Mack, J. S. Townsend and A. G. Young.

Samuel W. Gardner has been appointed superintendent of the rolling mill department of the Ohio works of the Carnegie Steel Co., Youngstown, O. He succeeds his brother, John T. Gardner.

T. S. Clark, vice president of the Sharon Steel Hoop Co., Sharon, Pa., has resigned and will leave in the near future for the South, where he will take up a permanent residence owing to the ill-health of his wife. Mr. Clark will continue his interest with the company and will continue as a member of the board of directors.

At the monthly meeting of the Engineers' Society of Western Pennsylvania, held at Pittsburg, Tuesday, Dec. 16, the following nominations for officers for the ensuing year were made: President, J. M. Camp, chief chemist Duquesne Steel Works; G. E. Flanagan, second vice president; A. E. Frost, treasurer; C. W. Ridinger, secretary; directors, two years: J. K. Lyons and Willis Whited.

Walter H. Whiteside, manager of the detail and supply department of the Westinghouse Electric & Mfg. Co., Pittsburg, has also been made general manager of the Sawyer-Mann Electric Co.

At a meeting of the Dominion Iron & Steel Co., Dec. 18, J. H. Plummer was elected president and Graham Fraser was elected a director with the title of director of works. L. J. Forget has resigned the vice presidency of the company.

The Philip Smith Co., Sidney, O., recently incorporated, will carry on the concern of Philip Smith, who has been in the manufacturing business at Sidney since '59, being sole proprietor. The business will be conducted the same as it has been. The incorporators and stockholders are long-time employes of Mr. Smith, who retains an interest in the company and will act as president. C. A. Davis, the vice president, has been in Mr. Smith's employ for a number of years as traveling salesman; B. D. Heck, who has had charge of the office, is secretary and treasurer, and Chas. Widmer, who has been foreman of the machine department, is superintendent.

For the season of 1903, 21,654,898 tons of iron ore passed through the canals at the Soo, Michigan and Ontario, against 24,277,555 tons in 1902, a decrease of 11 percent. The tonnage of hard coal increased 271 percent and that of soft coal 29 percent.

The Griffin Wheel Co., Chicago, has increased its capital stock from $3,000,000 to $4,000,000. The Chicago plant of the company, which manufactures car wheels, has recently been enlarged and is in operation night and day.

The new plant of the Wilmington Malleable Iron Co., Wilmington, Del., is now making cores and trying machinery. The whole plant will not begin operations, however, until January.

The contract for the structural steel for the Rockefeller building, Cleveland, including its erection, has been awarded to the Forest City Steel & Iron Co., Cleveland.

Judge Thompson, of the United States Court, has appointed Cyrus Huling, of Columbus, receiver of the United States Sheet & Tin Plate Co.

The Labor Situation.

NEWS OF THE METAL TRADES ASSOCIATION.

A general meeting of the Pittsburg Manufacturers' Association is called for Jan. 4 to consider the apprenticeship agreement.

The next ballot of the National Metal Trades Association will go out next week and will contain the names of at least six applicants representing large interests.

The Connecticut Valley Metal Trades Association reports that it will have its labor bureau in operation in the near future.

The St. Louis Metal Trades Weekly Bulletin reports business good and shops running with few changes. A meeting of the executive board of the association is announced for Jan. 5.

The Worcester Metal Trades Association reports business picking up, with increasing calls for operatives. A humorous incident was reported from the same source. A member had a machine at which a short-legged mechanic could work to better advantage than a long-legged one and the labor bureau was successful in supplying a workman with the desired leg measurements.

The Administrative Council of the N. M. T. A. has decided upon Philadelphia as the place for holding the next annual convention and the time will be somewhere between March 15 and 31. In view of the success of the Buffalo and Cincinnati conventions of the past two years, it is planned to repeat the method adopted for them and have all topics for papers and discussions arranged in advance so that the business of the convention may move on promptly.

At Philadelphia 35 firms in metal-working trades have signed an agreement to organize a local metal trades association and establish a labor bureau. Baltimore is also taking up the bureau idea, and steps will be taken to establish a bureau there which will be in the hands of a paid secretary.

With Springfield, Worcester and Boston operating employment bureaus, good help is expected to be more plentiful in those cities than in other New England centers.

At the Edison Phonograph Works at Orange, N. J., the screw machine hands recently put a limit on production, working piece work. Exception being taken to the practice, the machine hands quit work. The National Metal Trades Association took the matter up and the Edison works are now overrun with applications.

NATIONAL CIVIC FEDERATION.

At the session of the National Civic federation in New York, Dec. 19, it was decided to organize four special sections representing the building trades, metal trades, public service corporations and textile industries, each section to be composed of a committee of nine members, three members being appointed from each of the three classes represented in the Civic Federation, the employers, the wage earners and the public. Power was vested in President Hanna to appoint the committees. These committees when appointed will also seek to promote the joint trade agreement idea in all these lines whenever practicable.

By a resolution unanimously adopted it was also decided to carry out in each of the cities selected by the executive officers the policy of conciliation now operative in the Civic Federation. This was in response to many applications for the appointment of conciliation committees in cities in which no local organization of the federation has yet been formed, among them being Montreal and Toronto.

LABOR NOTES.

President Hunt of the Cleveland Builders' Exchange and contractor L. Dautel, who represented the Cleveland Exchange at the Chicago meeting at which the National Building Trades Employers' Association was organized, are opposed to the Cleveland Exchange affiliating with the new organization. They believe that it is forcing Chicago methods on builders of other cities and that the attempt will not be successful.

It is estimated that 2,700 men will be affected by the decrease in wages which goes into effect in the mills of the United States Steel Corporation at Joliet, Jan. 1.

Conditions in the steel mills at South Chicago and at Indiana Harbor are becoming more strained. Five hundred employes of the Inland Steel Co. have refused to go to work unless the company recognizes the union. President Shaffer of the Amalgamated Association is now in Chicago endeavoring to adjust the trouble.

Schill Brothers Co., Crestline, O., manufacturer of furnaces and steel ranges, and employing nearly 400 men, has closed its plant on account of labor troubles. The plant has been union, but on account of what the company considers unreasonable demands of its employes, an open shop will be established.

President Eidlitz, of the Building Trades Employers' Association, of New York City, states that the association will not agree to anything not in harmony with the arbitration agreement between the association and unions, hence it will not co-operate with the open shop policy of the National Building Trades Employers' Association.

The Iron Molders' Union has begun proceedings at Boston to put a stop to an alleged system of extortion by which, it is claimed, ignorant men pay for positions. A bill in equity has just been filed in the United States Circuit Court at Boston against two foremen in a foundry at Lynn, Mass. The plaintiffs ask that the defendants be restrained from demanding a consideration for selecting applicants for employment.

At a meeting of 200 prominent business men of Salt Lake City, Utah, Dec. 18, it was decided to organize a citizens' alliance for the purpose of combating labor unions and discouraging strikes and lockouts.

Employes of the New Haven Iron & Steel Co., New Haven, Conn., have declined to accept a reduction of 10 percent in their wages proposed by the company. The reduction was put into operation about three weeks ago and the employes have been working under protest.

The Pennsylvania Rolling Mills, of Lancaster, Pa., employing 400 men, have closed down for an indefinite time.

The employes at the black mill of the McCullough Iron Co., Wilmington, Del., returned to work Dec. 15. They had a misunderstanding with the company but the trouble has been adjusted.

The first open opposition to the general wage reduction in the Connellsville coke region began Dec. 18, when 100 skilled mechanics in the employ of the Connellsville Mfg. & Mining Co. refused to accept a 12½ percent reduction and went on a strike.

After a prolonged meeting on Dec. 19 the machinists' union, of Youngstown, decided to accept the reduction in wages made by the machine shop operators in that city. The reduction varies from 5 to 15 percent. About 400 employes are affected.

The Bessemer Furnace Association has decided to reduce the wages of all blast furnace workers 10 percent beginning with Jan. 1. Some of the operators in the Mahoning and Shenango Valley have already made reductions of from 12 to 15 percent.

The reduction in wages of miners in Minnesota mines of the United States Steel Corporation, noted last week, has been followed by similar action at the Michigan mines, all reductions to be effective Jan. 1.

H. H. Campbell, general manager of the Pennsylvania Steel Co., said Dec. 20 that no general reduction in wages at the works at Steelton is now contemplated. In some of the mills there has been a great increase in tonnage in recent years and the company has taken the matter up with the men to make a readjustment of some of the rates. Propositions have been submitted to them as individuals and the company expects the rates so submitted will be satisfactory. Mr. Campbell also said that, with the exception of certain cases in the Bessemer department, the reduction in the tonnage rates of the men affected will run about 20 percent.

Three hundred miners at the Searles coal mines of the

Alabama Consolidated Coal & Iron Co. are out on a strike, the difference being in regard to wages.

The employes of the Granite City plant of the American Steel Foundries have been notified by the management that the plant will resume operations Dec. 28. The works have been closed since last August owing to continued strikes among employes. All differences between workmen and the company have been adjusted and the plant will resume operations as an open shop. It is estimated that by Jan. 1 the full force of 3,000 men will be at work.

Between 75 and 100 coremakers at the plant of the Northwestern Malleable Iron Works, Milwaukee, went on a strike Dec. 16 on account of reduction of wages recently announced by the company.

LAKE SUPERIOR IRON MINES.

The Drake & Stratton Co. stopped all its stripping shovels last week and will not resume until about March 1. The company has been stripping this year at the Stevenson, Fayal, Leonard, Morris and other mines, employing some 11 shovels, 30 to 40 locomotives of various sizes, and more than 1,000 men. It has moved about 2,500,000 cubic yards of material this year, including earth, hardpan, rock and boulders. This firm has in sight for next year about 1,800,000 yards of work, in which that at Fayal is the chief item. Stripping conditions on the Mesabi range have changed very materially in two years. Up to that time there were but two important firms engaged in the business—Drake & Stratton Co. and Winston & Dear. The former had all the work but that at Mahoning, which was regularly under charge of the other concern. Encouraged by independent operators who had considerable stripping to be done, other firms entered the business, until now there are some six new concerns at work on the Mesabi alone, all with remunerative contracts. These are all said to have made much money. The firm of Richards & Lundeen, of Minneapolis, successor to Halvorsen & Richards, has made an assignment. The firm had bought some $90,000 in machinery this year and paid for it out of season profits, but had large amounts outstanding, both here and from railroad work elsewhere. They had two stripping contracts on the Mesabi. The immediate cause of the assignment seems to have been a misdirected draft for a large sum.

D. T. Adams and D. N. Morrison, who have been exploring on section 15-59-14, have pulled out and stored their drills. Some months ago this was an exceedingly promising exploration, according to those that visited the place, but it was not in a location that seemed desirable. It was reported in daily papers to be another Mahoning.

A few weeks ago a townsite was platted near the Stephens mine, on the east end of the Mesabi range, and quite a number of lots were sold on the original boom. But this was a boom that was nipped in the bud, for the Stephens is a steam shovel mine, and the only other property in the neighborhood is the Pitt Iron Mining Co.'s Miller, which was closed tight a few days after the village started. Now the bank, general store, boarding houses, saloons, etc., are deserted and the town is depopulated. The Stephens will resume in the spring on a moderate scale, but it cannot afford much business for a village.

Glen mine, at Hibbing, of the Minnesota Iron Co., is hoisting very heavily, and it is intended to have four times as much ore on surface next spring as a year ago. The stockpile grounds have been enlarged and the mine is working actively.

It is now expected that Shenango mine, belonging to the Clairton interests, will commence hoisting ore in February. It was two years ago last fall when development at this mine commenced and they have been busy ever since. The Shenango is in section 22-58-20 and is a very valuable mine. It is, however, very wet, and this, combined with quicksand, has been too much for early completion of development work.

Contracts will soon be let for the construction of a line of road from the main line of the Duluth, Missabe & Northern road to the Monroe, Chisholm, Clark and Shenango mines. It will be about five miles long, including spurs, and will have one high trestle 1,750 feet long, much of which is double track. It will be needed for ore traffic in the spring. It leaves the main line in section 1-57-20 and runs northwest.

Colby and Ironton properties near Ironwood, Mich., are looking well and development work continues. Shafts are going down and drifting is under way. At Ironton mine the outlook is especially favorable for a large property.

Two hundred and fifty men who had just gone to work stripping Leonard mine, near Hibbing, were thrown out by reason of a demand of four steam shovel cranesmen for 30 cents a day better wages. The shovels were both closed for the winter. These cranesmen were getting $4.50 a day. The force worked four and a half days and will now look for something else till next April.

The large pumping station at Maas mine, Negaunee, will soon be started. It will be 200 feet underground, 50 feet in ledge, in a large rock chamber. With this station completed and the pumps moved to it sinking should be much faster, probably increasing to 5 or 6 feet a day. It will be a year before this mine can be hoisting much ore.

While a number of the other Lake Superior companies will follow the example of the United States Steel Corporation in reducing wages by 10 percent on Jan. 1, there are exceptions, some companies hesitating to add to the depression in the towns dependent upon them, by cutting wages in mid-winter when already a considerable number of men are idle altogether.

Prices of Steel Reaffirmed.

At the meeting of manufacturers of structural steel, held in New York last week, the price of 1.60c, Pittsburg, was reaffirmed. The next meeting will be held July 1 at Atlantic City. W. C. Temple, of Pittsburg, made the following statement after the meeting: "The meeting was a unit in agreeing to continue the present prices. Of course there was a great deal of talking of shifting prices, but it was finally deemed wiser to let them remain as they are." A representative of the Jones & Laughlin Steel Co. said that the outlook in the steel business was brighter than at any time since the depression began. An authority on the affairs of the United States Steel Corporation is quoted as saying: "I am confident that the present schedule of prices will be maintained. The demand is becoming better, and a reduction in prices would only serve as a setback to this improvement."

The steel plate manufacturers also reaffirmed the 1.60c base price. Mr. Temple said after the meeting that, as at the structural steel meeting of the day before, there was practically unanimity of opinion. "The building strikes," he said, "have cut very little figure in the steel plate market, for comparatively little steel plate goes into building construction. Plate steel is used more largely in other fields, such as bridge buiding and boiler construction. Manufacturers generally have found the market brisker, if anything, than last year's was."

The manufacturers of billets decided to maintain the existing price of $23 per ton. The next meeting will be held in April. One of the representatives of a leading company made this statement:

"There is no truth in stories that there has been friction among the billet manufacturers, and that the Crucible Steel Co. of America had threatened to withdraw and to undersell the other manufacturers. The Crucible company was represented at today's meeting along with other manufacturers. We know nothing about the story that independent billet makers have been cutting the market $2 a ton."

The price of steel rails remains at $28. The nut and bolt manufacturers also held a meeting and continued existing prices.

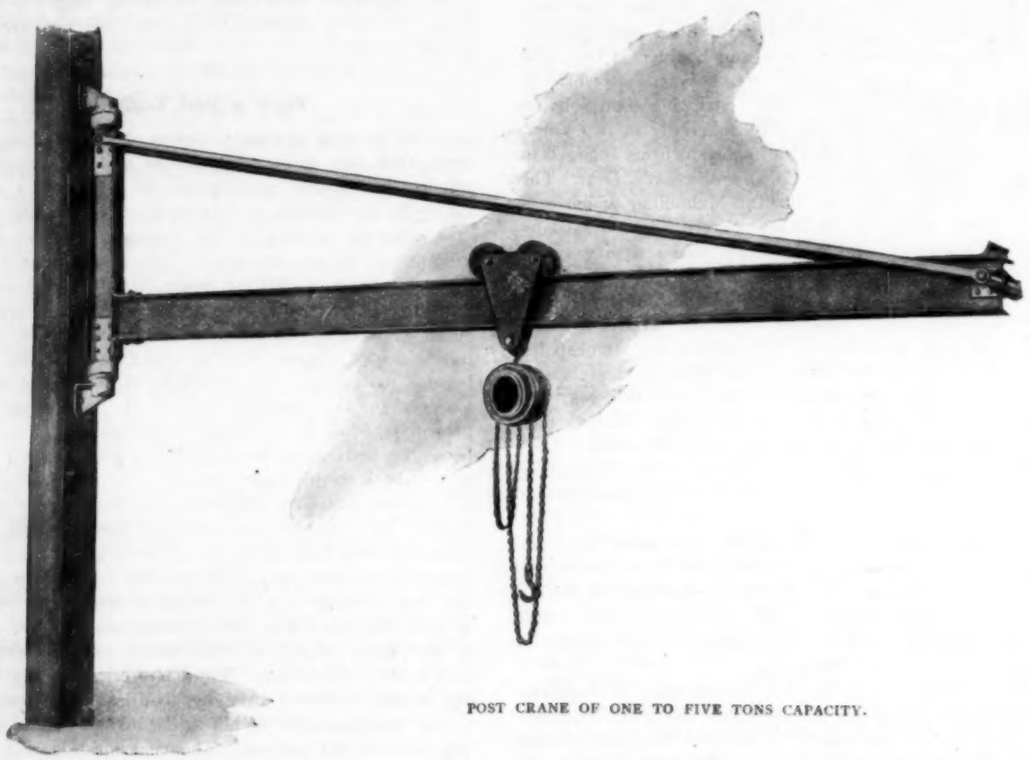
It is officially announced that the open-hearth department and the plate and slabbing mills of the Illinois Steel Co. at South Chicago will be closed Dec. 24. About 4,000 workmen will be thrown out of employment. How long the shutdown will continue is not known. The converter and billet departments at Joliet closed down Dec. 21 for an indefinite period. The rolling mills are also closed and 1,500 men are idle.

The main building of the Skillman Hardware Mfg. Co., Trenton, N. J., was destroyed by fire Dec. 16. Loss, about $40,000.

POST CRANE OF ONE TO FIVE TONS CAPACITY.

The accompanying cut shows a post crane which the New Jersey Foundry & Machine Co., of 9 and 15 Murray street, New York, has recently placed on the market. It was designed to meet the demand for a light, inexpensive crane for foundries, erecting and assembling shops, serving machines, etc. The general construction is indicated. The bearings at top and bottom of the mast are of the caged roller type, and the downward thrust is taken up by a bronze plate between two hardened steel plates. The trolley is roller bearing and can be furnished to run either on the top or bottom flanges of the I beam. If desired a geared trolley can be furnished for racking with hand chain. The tie rods are so spaced as to allow a maximum trolley travel, the wheel stop being at the end of the jib, as shown.

In putting up these cranes the bracket bearings are bolted to a post, column or wall. By a slight variation in the construction of brackets and bearings, the crane can be lifted from the sockets and transferred to other duplicate sockets placed at desired points, thus covering a large floor space with one or more cranes. The demand has been thus far chiefly for the one-ton crane, with 15 feet trolley travel, but they are finished up to 5 tons capacity and 20 feet trolley travel.



POST CRANE OF ONE TO FIVE TONS CAPACITY.

Milwaukee Foundrymen's Association.

A business meeting and an informal dinner of the Milwaukee Foundrymen's Association are announced for Tuesday evening, Jan. 12, at 7:30 o'clock, the object being better acquaintance among the foundrymen of that city and the strengthening of the local association. The following questions, in addition to others, are to be discussed:

"Membership in the National Foundrymen's Association—Protection," by Irving H. Reynolds.

"Membership in the American Foundrymen's Association—Education," by Chas. E. Sammond.

"Membership in the Milwaukee Foundrymen's Association—Association," by Thos. W. Sheriffs.

"Membership in the National Association of Manufacturers," by F. W. Sivyer.

"The Next Molders' Agreement," by O. W. Greenslade.

"The Employers' Rights," by A. J. Lindemann.

The meeting will be presided over by W. J. Turner. Chas. E. Sammond, Irving H. Reynolds and Clarence R. Falk are the committee on arrangements.

EASTERN PENNSYLVANIA.

HARRISBURG, PA., Dec. 22.—A general readjustment of wages is being made in the mills east of the Alleghenies and those not idle are making their scales fit conditions. More orders are reported in sight and there has been considerable inquiry, which has caused most of the managers hereabout to take a hopeful view of the new year.

The Central Iron & Steel Co. rolled a number of sheared plates a few days ago that were 50 feet long, 72 inches wide and three-eighths of an inch thick. The company is rushing along work on its new open-hearth department and on a blast furnace which is being repaired.

The situation at Lebanon is the worst since 1896. Of nine furnaces in the county just one is in operation. The Pennsylvania Steel Co. and the Robesonia furnace may start after the first of the year, however. Some of the American Iron & Steel Mfg. Co.'s mills are running, as are several chain and boiler works, but the volume of business is not large. The Petty Boiler Works have started a new building to replace one which was burned.

There were 100 corporations chartered by the State of Pennsylvania here last week, the largest number for a long time. Among them were the Fayette Foundry Co., Uniontown, capital $15,000; Attwood Chain Co., Lebanon, capital $100,000; Landis Machine Co., capital $50,000; and Hendricks Mfg. Co., capital $15,000, both of Waynesboro; and the A. B. Warman Lackawanna Foundry Co., capital $15,000, Scranton.

The E. & G. Brooke Iron Co. will start another furnace in 1904. The Leesport furnace and one of the Reading Iron Co.'s stacks will be started soon. They are now being repaired.

The Lehigh Valley situation is not much improved. The number of active furnaces is small and the companies are not at all anxious about putting their stacks into blast until the Eastern iron market improves. A number of them have reduced wages and will not bid for long-time contracts.

The Altoona Rolling Mills have been started after a short suspension.

The Sharon, Pa., plant of the American Steel Foundries Co. resumed operations this week. The men agreed to accept a reduction of about 10 percent, dating from Dec. 1.

The Safety Steel Derrick Co., organized at Bowling Green, O., has moved its plant to Deshler, O. About 40 men are employed by the company.

ALTERATION OF FIRE BRICK BY BLAST FURNACE GAS.*

BY FRANK FIRMSTONE, EASTON, PA.

The furnace from which the brick here referred to were taken, was lined under my supervision and blown in in May, 1902. It was 75 feet high and 18 feet greatest diameter, and used coke to smelt a lean magnetic iron ore. The lining was put in as follows:—First, blocks 14 inch long by 6 inch thick; second, 2 inch of loam; third, 13.5 inch of 9-inch fire brick (one-and-a-half brick wall) laid in English bond; fourth, red brick to within 2 inches of the iron shell; and fifth, 2 inch of slag-wool between the red brick and the shell.

The brand of brick used has been known to me for over 20 years, and in my observation had always proved very durable, notably when used in a small furnace 50 feet high which treated the same magnetic ore. On revisiting and examining the furnace in March, 1903, it was found that the whole of the lining of 14-inch blocks at the top, and for an unknown distance (more than 20 feet) below, had completely disappeared; and a few weeks later the 13.5-inch lining and the red brick at the top likewise vanished, and the furnace was blown out. Notwithstanding the complete failure of the lining higher up, measurements taken after blowing-out showed no unusual wear in the lower part of the furnace.

The exact position in the furnace of the piece of brick work used in the analysis, given below, is not known; but it came from between 30 and 40 feet above the bottom. It had formed part of the 13.5-inch wall (no 14-inch brick remaining at that level) and consisted of parts of several bricks so firmly sintered together that fracture occurred indifferently through the joints and through the body of the brick. The joints could, however, be traced by a close examination. The surface which had been in contact with the material in the furnace was covered with a yellowish, translucent glaze, somewhat vesicular, and from 1-16 inch to 1-32 inch thick. The body of the brick was much stronger than a new one; the fracture resembled porcelain of bluish-gray color with occasional spots (near the glazed surface) nearly black. No deposited carbon was visible, nor was any carbon noticed in the course of the analysis, although it was looked for.

ANALYSES OF PARTS OF THE FURNACE LINING.—BY DR. P. W. SHIMER.

Components.	Glazed Skin About 1/32 in. Thick	Body of Brick	Joint (b)
	Per cent.	Per cent.	Per cent.
Silica	40.28	57.63	.....
Alumina (a)	12.22	31.64	.....
Iron protoxide	11.93	3.73	6.60
Lime	10.92	0.24	.....
Magnesia	4.31	0.11	.....
Potash	7.39	2.59	2.39
Soda	8.43	0.51	0.79
Metalic iron	.....	1.51	.....
Zinc oxide	.....	0.59	.....
Total	97.43	98.55	.....
Total iron	9.28	4.41	4.62

(a) Includes any titanium oxide present.
(b) The bricks were laid in a mortar of ground clay and crushed brick, both furnished by the makers.

The sample analyzed from the body of the brick was taken from a point at least an inch away from the glazed surface and at least that distance from any joint.

ANALYSES OF BRICK FROM THE SAME MAKERS, BEFORE USE.—BY DR. P. W. SHIMER.

Components	9-in. Brick Used in Lining, 1902	Brick made in 1896
	Per cent.	Per cent.
Silica	55.62	56.12
Alumina (a)	38.55	37.48
Iron sesquioxide	4.17	4.43
Lime	0.24	0.36
Magnesia	0.24	0.29
Potash	0.95	0.99
Soda	0.29	0.23
Total	100.06	99.90
Total iron	3.10	2.92

(a) Includes any titanium oxide present.

*Read at the New York meeting of the American Institute of Mining Engineers.

Many spots of iron oxide were visible on the fractured surface of the brick. The burnt-clay basis (chamotte) was nearly white and not very fine; the cementing clay was of light-brown or buff color. Iron oxide and the alkalis have increased each about 50 percent in the altered brick, and there is a slight apparent increase in silica and a considerable decrease in alumina. The presence of metallic iron was proved by first triturating in an agate mortar, then treating the magnetic part of the powder with copper sulphate and again triturating, which revealed abundant scales of metallic copper. Iron was then easily detected in globules, plainly visible with a pocket-lens on a ground surface of brick. Occasionally, these globules were large enough to be seen easily without the aid of a glass. A single hexagonal crystal (probably of zinc oxide) was seen in one cavity, but it was lost in trying to extract it. All attempts to prepare a thin section have failed. The body of the altered brick is very hard and quite opaque, and the numerous cavities cause the section to break up long before it is thin enough to transmit a sufficient quantity of light.

The destructive action of blast-furnace gases on the lining-brick has often been noticed, and a number of papers have appeared on the subject since 1875; several of late years in *Stahl und Eisen*. One case, occurring at a furnace in the Cleveland district in 1875, was very thoroughly investigated by Mr. John Pattinson, of Newcastle-upon-Tyne, and the results were published in *Jour. I. and S. Inst.*, No. 1, 1876, p. 85. Another, at Friederich-Wilhelmshütte, Mülheim a. d. Ruhr, was published by Limbor in *Worchenschrift des Ver. deut. Ingen.*, 1878, p. 259, and more fully, including a discussion of Pattinson's results, in *Bull. de l' Industrie Minérale*, 2d ser., tome x. (1881), p. 483. In both of these cases the brick in an intermediate zone of the furnace were disintegrated by carbon deposition, brought about by the action of carbonic oxide on the spots of iron oxide in the brick, in accordance with the well-known action between carbonic oxide, iron oxide and metallic iron at certain temperatures; while lower down, the bricks were largely impregnated with alkaline salts. In the case I am now reporting, I have no doubt that the same action destroyed the brick in the upper part of the furnace, but positive evidence is lacking because of the total disappearance of the bricks a little above the place from which the piece analyzed was taken. In confirmation of this opinion it was noticed that the cast iron hopper had been much attacked by the gas, and presented, in places, considerable cavities filled with carbon and particles of disintegrated cast iron. There were also considerable deposits of carbon in several places where two castings had touched without making a gas-tight joint.

This action of the gas on the cast iron has been less noticed than that on fire brick. Before the general substitution of closed for open-topped furnaces in the Lehigh Valley (before 1870), it was a common practice to protect the brick near the top of the furnace against mechanical wear by the use of cast angle-irons, one leg being laid in the bed-joint of the bricks and the other covering the face.

After the furnace-tops were closed, it happened in several cases that so great a carbon deposition in the bed-joints was provoked by the presence of these angle irons, that the lining-rings and hoppers were raised as much as 9 or 10 inches, and had to be reset. Not only was there much carbon deposition in the joints, but the castings themselves were disintegrated in places, and swelled to nearly double their original thickness. Specimens of such castings in my possession, taken from No. 2 Furnace at Glendon, in 1878, show that this action was very irregular, without clearly revealing why some spots were attacked while the rest of the casting escaped. In some of them, however, the action had plainly begun where the gates had been knocked off (which left a surface not covered by the skin of the casting) and from the gates it had extended under the skin which had been raised up and even curled over in a remarkable manner.

These difficulties caused the general abandonment of the angle plates, and at Glendon we substituted cast iron aprons hung by bolts from the lining rings. In exceptional cases these also were attacked in spots, but only in furnaces making foundry iron and, consequently, running on a relatively light burden.

Mr. Pattinson points out that such failures must be due to exceptional circumstances, and the same may be said in the present case. It is true that the bricks are higher in iron than is desirable, but exactly similar bricks (to judge by the analysis and by the appearance of the fractured brick) have never before, in my observation, failed in like manner. In Mr. Pattinson's case it is probable that the furnace had been more or less scaffolded, perhaps from the use of fine ore (*op. cit.*, p. 92); at the Friederich-Wilhelmshütte, the furnace had been making foundry iron. In the case under discussion, owing to the state of the coke supply in the summer of 1902, the furnace was several times stopped for want of coke between the beginning of August and the middle of November, standing at times for several weeks. This probably caused more or less scaffolding, and certainly caused the furnace to be run frequently with a very light burden.

It is easy to see that scaffolding may favor carbon deposition; also, that the local rise in temperature, which is sooner or later manifest over a scaffold (where the cooling effect of the descending materials is diminished or totally suspended) may be favorable to the impregnation of the brick by alkaline vapors. Unlike Pattinson's and Limbor's cases, this case showed no sign of soluble salts in the brick analyzed. The discovery of iron carbonyl by Messrs. Mond and Quincke suggests a possible but not probable means whereby the increased percentage of iron may have been introduced into the brick.

WAGES IN THE CONNELLSVILLE REGION SINCE 1894.

Since Feb. 10, 1894, the wages of the coal miners and coke operators of the H. C. Frick Coke Co. in the upper and lower Connellsville regions in Western Pennsylvania have been advanced six times, while the recent reduction, effective on Dec. 16, is the only reduction made in almost ten years. The following wage rates have obtained in the coke regions at the Frick plants in the past ten years:

	Feb. 10, 1894	April 1, 1895	Oct. 1, 1895	Jan. 1, 1896	April 29, 1899	Feb. 28, 1900	Jan. 1, 1903	Dec. 16, 1903
Mining and loading room and rib coal, per 100 bushels	$ 78	$ 90	$ 95.4	$1 05	$1 12½	$1 25	$1 35	$1 10
Mining and loading heading coal, per 100 bushels	88	1 02	1 08	1 20	1 27½	1 40	1 50	1 25
Mining and loading wet heading coal, per 100 bushels	95	1 10	1 16.6	1 25	1 32½	1 45	1 55	1 30
Drawing coke, per 100 bushels, charged	43	50	53	60	64	72	77	63
Leveling, per oven	08	09	09.5	10.4	10½	12	12¾	10½
Drivers and roperiders (shafts and slopes), per full run	1 65	1 84	1 95	2 05	2 12½	2 35	2 50	2 20
Drivers and roperiders (drifts), per full run	1 60	1 75	1 85.5	1 95	2 02½	2 25	2 40	2 10
Cagers, per full run	1 65	1 84	1 95	2 05	2 12½	2 35	2 50	2 20
Tracklayers, blasters and timbermen (shafts and slopes), per day	1 65	1 84	1 95	2 05	2 12½	2 35	2 50	2 20
Tracklayers, blasters and timbermen (drifts), per day	1 60	1 75	1 85.5	1 95	2 02½	2 25	2 40	2 10
Assistant tracklayers and inside laborers, per day	1 35	1 50	1 59	1 65	1 72½	1 87½	1 97½	1 65
Dumpers and tipplemen, per day	1 35	1 50	1 59	1 68	1 75½	1 90½	2 00½	1 68
Teamsters, per day	1 35	1 40	1 48.4	1 55	1 65	1 80	1 90	1 60
Carters, per day	1 20	1 25	1 32.5	1 40	1 50	1 60	1 70	1 50
Yard laborers, per day	1 10	1 20	1 27.5	1 35	1 45	1 55	1 65	1 40
Chargers, per oven	03	03½	03.7	04	04¼	04¾	05	04
Chargers, per day	1 40	1 50	1 59	1 68	1 75½	1 90½	2 00½	1 75
Trapper boys, per day	50	58	61.5	68	78	1 00	1 10	93
Forking cars, 50,000 lbs. capacity, per car	85	1 10	1 16.6	1 25	1 35	1 50	1 65	1 40
Forking cars, over 50,000 lbs. and 60,000 lbs. capacity, per car	95	1 25	1 32.5	1 40	1 50	1 65	1 80	1 50
Forking cars, more than 60,000 lbs. capacity, per car	75	1 00	1 06	1 25	1 35	1 50	1 65	1 60

The Hanging Rock Region.

IRONTON, O., Dec. 21.—The plant of the Belfont Iron Works Co., which was closed down for some days owing to the reduction in the natural gas supply, is again in operation, coal having been substituted for gas.

A representative of the Republic Iron & Steel Co., who was in the city last Thursday, expressed the opinion that the company's Eagle mill plant here would be abandoned, along with several other rolling mills of the company.

J. P. McCaslin, formerly local manager for the Republic Iron & Steel Co., and W. Wilkoff, of Youngstown, O., were here last week and purchased the old puddling mill of the Kelly Nail & Iron Co., which has not been used since the introduction of wire nail machines some years ago. The plant is being loaded for shipment to Cuyahoga Falls, O., where it will be installed in a plant to be operated by the purchasers under the name of the Independent Rolling Mill Co.

It is understood a number of changes are contemplated in the official family of the Ironton Disc Plow Co., which will dispense with the services of a number of the promoters of the enterprise.

A number of Ironton and Ashland capitalists are said to be interested in the purchase of the Kelly Axe Mfg. Co.'s large plant at Alexandria, Ind. The deal was to have been closed in New York last week, the purchase price being about $800,000. The plant will be brought to this section of the Ohio valley, but the location has not been decided upon.

In Common Pleas Court last week the tax inquisitor brought suit to compel Auditor Brown to place on the tax duplicate additional valuations for the Belfont Iron Works Co. and the Kelly Nail & Iron Co., aggregating hundreds of thousands of dollars and extending over a period of several years. The action will be strongly contested by the companies.

AMERICAN SHEET & TIN PLATE CO.

The American Sheet Steel Co. and the American Tin Plate Co. will be consolidated the first of the year under the name of the American Sheet & Tin Plate Co. The present offices in New York of both companies will be abolished as soon after Jan. 1 as possible and will be removed to Pittsburg. Offices for the combined companies have already been secured in the Frick building, and when the sales and executive departments have been removed from New York, the operating and local sales departments of both companies will be removed from the Vandergrift and Carnegie buildings respectively to the Frick building. Geo. G. McMurtry, president of the American Sheet Steel Co., has been elected chairman of the board of directors of the new company and W. T. Graham, president of the American Tin Plate Co., will be president. W. M. Leeds, of the American Tin Plate Co., has been elected first vice president and E. W. Pargny, of the American Sheet Steel Co., has been elected second vice president. H. B. Wheeler will be secretary and treasurer. By this consolidation operating expenses can be reduced very materially both in sales and operating forces, as well as in the executive department.

W. M. Leeds, who becomes first vice president, has been head of the tin plate operating department. Mr. Pargny has been manager of the sheet mills in the Kiskiminetas valley, which are the largest and most important of the American Sheet Steel Co. H. B. Wheeler is a brother of Frederick S. Wheeler, who was prominent in the formation of the American Tin Plate Co., and treasurer until he became associated with the American Can Co.

The Empire Steel & Iron Co., Catasauqua, Pa., has declared a dividend of 1 percent on its preferred stock, making, with the dividend of 2 percent paid on July 1 last, 3 percent for the year, thus maintaining the average rate of 3 percent per annum which has been paid by the company for the last four years. The net earnings of the company for the 11 months ended Dec. 1, according to figures submitted at the meeting of the board of directors, were about $320,000. Total dividend requirements for the year are $75,000.

The Remington Typewriter Co., Ilion, N. Y., has announced that on account of the general depression which has affected the sale of typewriters, it has been obliged to lay off about 300 men. The number of employes remaining is about 1,300. The output of the company's factory of about 250 machines a day will be decreased about one-sixth.

Manufacture of Welded Pipe.—II*

BY VICTOR BEUTNER.

Since both methods of manufacturing pipe, treated in this talk, depend upon the successful heating of the skelp to a temperature at which the edges can readily be united or welded, the apparatus to produce this heat—the furnace equipment—occupies a very prominent position in the design of a pipe mill.

The development of the pipe welding furnace has been about the same as that of the metallurgical furnace in general. From the open smith fire sprung the short coal fired heating furnace, which grew longitudinally until it could receive the full length of the pipe. One whole side of it was occupied by the fire box, from which the flame played across the hearth into the flues on the other side, to be drawn into the stack. In the anthracite region such furnaces are still in use in mills where, owing to their connection with mines, anthracite in any quantities is considered economical. Some of the mills in the Pittsburg district employed practically the same type of furnace, only using natural gas and substituting a number of burners for the fire boxes. The one great step forward in the construction of welding furnaces, however, came shortly after 1861, when Sir Wm. Siemens established the principle of regeneration, and the gas fired regenerative welding furnace is today universally used in pipe mill work.

Under regeneration, we understand the storing of waste heat of the escaping gases after combustion in the furnace and the utilizing of this stored heat to raise the temperature of gas and air before combustion. This is accomplished by passing the off gases through chambers filled with brick checker work, by which a considerable amount of the heat of these gases is absorbed. After a certain time the operation of the furnace is "reversed" and air and gas passing through the heated chambers absorb the heat of the checker work, the off gases in the meantime heating another set of chambers. This reversal is constantly kept up and the temperature of gas and air before combustion becomes very soon intense. A greater heat on the hearth of the furnace proper and great fuel economy are the natural consequences.

As shown, the operations of the regenerative furnace depend upon a gaseous fuel, and together with his furnace Siemens put the first gas producer upon the market. Generally speaking, the producer consists of a brick-lined iron shell with suitable grates at the bottom for the admission of air either by natural draught, or in all modern constructions by steam blowers. The process is simple. After a producer is properly started, the carbon of the lower layers of coal is burned to carbon dioxide. This CO_2 rising through a layer of hot coal is reduced to carbon monoxide, while the water vapor caused by moisture or steam blast is decomposed by the incandescent carbon, forming carbon monoxide and hydrogen. To prevent the escape of any gas during the cleaning of the fires, a water pan has been introduced, which effectually seals the bottom of the producer, the clinkers and ashes resting in this pan and being removed below the water level.

Natural and Producer Gas.

Producers are generally arranged in a row, with convenient provisions for the handling of the coal, which is supplied either by an elevated track, running parallel to the producer platform, or by overhead conveying machinery. The gas is collected in flues either overhead or underground and distributed to the furnaces. A good producer will gasify seven tons of coal per day, giving in round numbers 1,000,000 cubic feet of gas. Producer gas consists of about

6 Carbon dioxide,
23 " monoxide,
8 Hydrogen,
3 Methane,
60 Nitrogen,

and as a fair average 120 B. T. U. per cubic foot might be figured. Usually two producers are provided for one furnace.

*Read before the Engineers' Society of Western Pennsylvania, Dec. 15, 1903.

In the Pittsburg district natural gas is used extensively, which shows a much higher calorific value than producer gas, having a heat value of over 1,000 B. T. U. Natural gas is mostly composed of from 60 to 70 percent methane or marsh gas (CH_4) and of from 20 to 30 percent hydrogen, with smaller proportions of other hydrocarbons. Owing to the fact that the hydrocarbons are decomposed even in a moderate heat, precipitating solid carbon, natural gas is directly introduced into the furnace without being previously "regenerated."

Since Siemens built his first furnace many improvements have been made. The cut, Fig. 16, shows an up-to-date welding furnace, embodying all these improvements. The regenerating chambers are situated below the furnace proper, the hearth being carried on a grill work of beams providing ample ventilation below. The air chambers each contain 1,000 cu. ft. of checker work and the gas chambers one-fourth less. The retaining walls around the chambers contain hollow

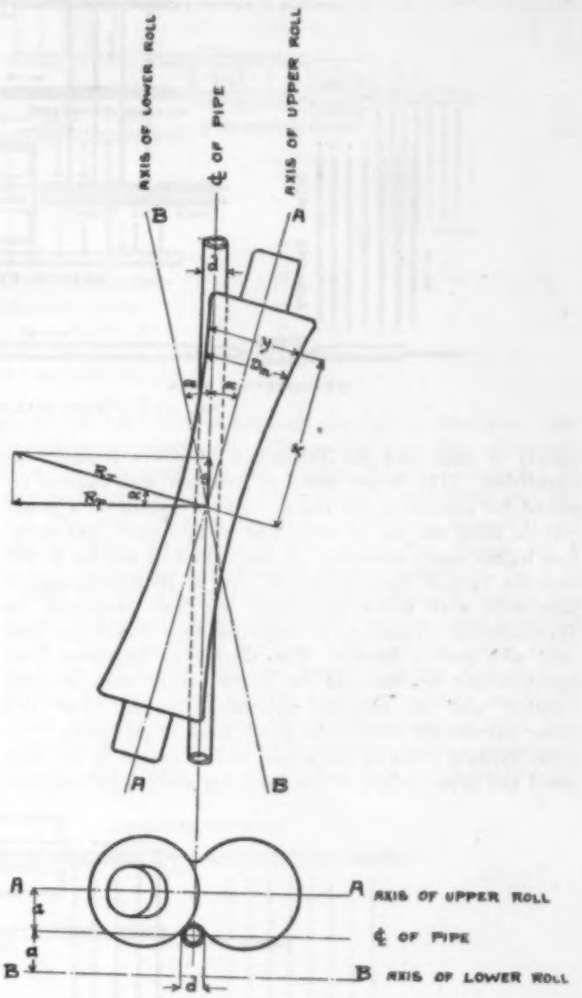


FIG. 8.—DIAGRAM OF CROSS ROLLS.

spaces arranged to drain any moisture seeping through the ground to a sump, from which it can be removed. From the chambers, alternating air and gas ports lead into the furnace, each provided with means of individual regulation. The brickwork of the furnace proper is kept as thin as possible, utilizing the cooling effect of the air outside to preserve the masonry. To support this frail brickwork, an extensive system of braces or binders is provided and indeed a modern furnace is a permanent steel frame structure with fire brick filler walls, which might be repaired, or replaced, whenever required. The construction of the reversing valves used for these and other Siemens furnaces is well known. The original Siemens or butterfly valve became invariably warped and permitted considerable leakage. The Forter water seal valve has overcome this difficulty, and is today used with great success. A separate self-supporting steel plate stacl of 100 feet height by 4 feet diameter is provided for each fur nace.

The application of power to drive the various machines used in the manufacture of pipe has presented an interesting problem. A modern lap weld mill arranged to roll from 8-inch to 16-inch pipe contains no fewer than nineteen individual machines, requiring various horsepowers ranging from 5 to 300. Line shafting with belts or gears and an occasional isolated engine were first universally used. At the best, line shafts with hangers and belts and steam pipes are a nuisance in a rolling mill, and here they either occupied valuable space overhead, obstructing everything else, or had to be buried in ditches hard of access. The perfection of the electric motor of various systems solved this difficulty. The motor occupies little room, and is made now of approval design, in a great variety of sizes, and the distribution of power is easily accomplished. The larger units of dynamos and engines required for generating the power, situated usually in a power station, allow the use of better type of equipment, and therefore higher steam economy. It would lead us too for to discuss the various types of motors, but in all installations of pipe mills with which the writer has been connected the Westinghouse 3-phase A. C. induction type motor has been used with perfect success. The absence of collectors, commutators and brushes and the heavy copper strip winding, together with its compact mechanical design, adopt this motor exceedingly well to the rough work in pipe mills. The great flywheel effect of the larger motors caused by the high speed and great weight of the revolving parts is of considerable benefit in cases where the work is done only for few consecutive seconds at the time. Variable speed is not required in pipe mill work, and, where necessary, the reversing of the motors can be readily effected by mechanical means. The difficulty to get several units of the dynamos to run "in step" has been successfully overcome. .

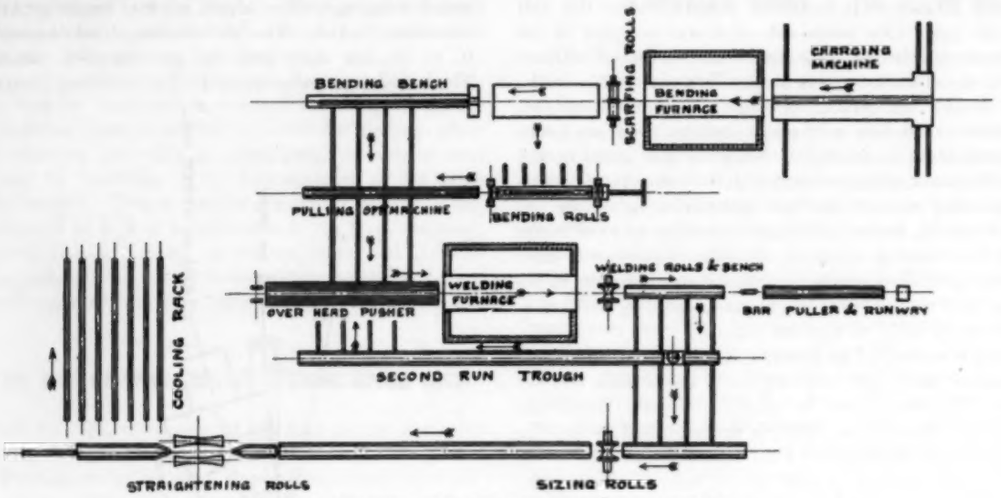


FIG. 9.—LAP WELD MILL FOR PIPE FROM 8 TO 24 INCHES.

The Machinery Used.

We come now to a discussion of the machinery proper, which serves to convert a piece of skelp into a marketable tube. For the manufacturing of lap welded pipe, the principle of which was shortly set forth above, two furnaces are required, one to heat the flat skelp for the bending operation, and the other to heat the previously bent skelp to a welding heat. The skelp is charged into the first, or bending furnace, either in single strips, or in piles, until the hearth of 7 feet or 8 feet width, of the furnace, is covered. For this purpose a bench or table equipped with a chain running over sprocket wheels is used, upon which the skelp is deposited by the crane. The table has a lateral, or sidewise motion, which permits it to be placed opposite any point of the full width of the furnace hearth. A hook or pusher rod is dropped into the links of the traveling chain and the skelp shoved into the furnace. A longer rod is used in the same manner to push the heated skelp through the furnace into the scarfing rolls.

When the two overlapping edges of skelp are united by welding, it is evident that either an extra thickness of material on this joint must appear, or that the pressure between the welding rolls and the ball must become very severe. To avoid either disadvantage, the skelp is scarfed, that is, its edges are beveled off, thus allowing in the lap the same contact surface, but less material. Originally this scarfing was done by cutting on machines built somewhat like plate planers, but this method has been surpassed by the far simpler process of scarfing in rolls. The drawing and the photograph show such scarfing rolls mounted again on wheels for lateral motion to suit the situation of the skelp in the furnace. The rolls have a beveled collar on opposite sides, the beveled surface of which forms the scarf, and can be laterally adjusted to suit the distance between collars to the width of the skelp. A scarfing table receives the scarfed skelp and transfers it sidewise until on line with the bending bench, when it feeds it forward into the bending die. The bending die is a large cast iron funnel-shaped affair into which the skelp is drawn by strong gripping tongs, which are hooked to the endless chain of a draw bench. The construction of the draw bench can be readily seen from the accompanying drawing. To avoid the lateral transfer of the skelp on the scarfing table, the scarfing rolls, scarfing table and draw bench are in some mills mounted on one carriage. The largest size of skelp, which can be successfully bent in

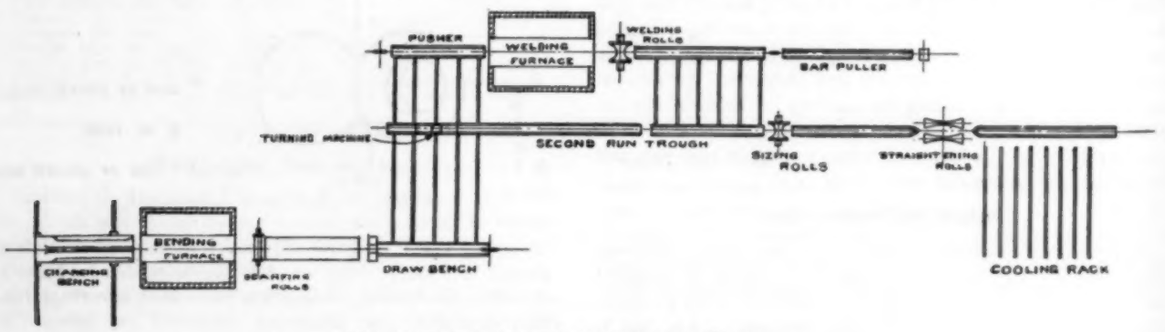


FIG. 10.—LAP WELD MILL FOR PIPE UP TO 8 INCHES.

dies without collapsing, is 12-inch pipe skelp, and few mills attempt to bend above 10-inch. Where larger sizes are desired—and we have today two mills in operation which can roll 30-inch pipe, and several more in course of construction—the skelp has to be bent in rolls, designed in general on the same lines as boiler bending rolls, but lately equipped with power feed, hydraulic pressure, and other improvements to operate same quickly and positively. Such rolls are usually situated parallel to the scarfing table, the lateral motion of which is increased sufficiently to drop the scarfed skelp sidewise between these rolls. Large sized skelp is usually tacked together by a rivet or two on each end to keep it from collapsing in the welding furnace.

The bent skelp is deposited on skids, conveniently located

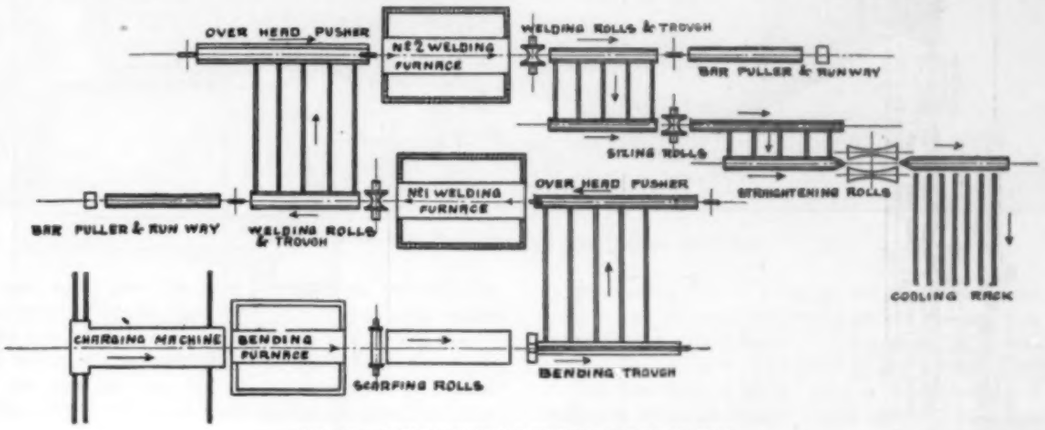


FIG. 11.—DOUBLE RUN BOILER TUBE LAP WELD MILL.

to the welding pit, as the depression on the charging side of the welding furnace is usually called. In this pit the hardest work and the work requiring the greatest skill is performed. The welder and his assistants charge the skelp, which has gone immediately before through the described process of bending, and is still red hot, through openings in the end walls into the furnace. The hearth of the welding furnace is slightly inclined towards the welding pit to cause the cinder to run off freely. The center of the hearth, which is in later furnaces over 7 feet wide, is occupied by the gutter in which the pipe, which is ready for the welding, rests. The charging openings are on both sides of the gutter, and the charged skelp is rolled over several times to expose all parts to the heat before it reaches the gutter, when the overlapping edges must be on top. According to the sizes of the pipe and the skill of the welder, two, three or five skelps are simultaneously in the furnace. As soon as the skelp in the gutter has acquired welding temperature, it is pushed out through the opposite end of the furnace, until the welding rolls situated as close as possible to the furnace grip it and force it over the welding mandrel—the ball. When you remember, that of the smaller sizes a good welder will weld a pipe every 30 seconds, that he has to superintend the charging and the pushing out, in addition to regulating his furnace, that he is further responsible for the good production, that he must guard against burning his pipe, or shoving it out before it has reached the proper heat, in which case it would either stick in the rolls or weld imperfectly, you will realize that the job of welding is no sinecure. The designers of modern mills especially intended for the production of larger sizes, have provided mechanical appliances for charging and pushing out, but the skill and responsibility of the welder is thereby not lessened.

The drawings and cuts show design of the welding rolls clearly. Pinions located in separate housings, pressure screws, bearings with side adjustment and counterbalanced rolls and many other improvements in use in general rolling mill practice, are used here. The rolls run at a very high speed, the velocity of the welded pipe reaching as high as 800 feet per minute. The ball shaped somewhat like a cannon shell is supported by a rod of much smaller diameter in exactly the center between the rolls. The pipe passes through these rolls, seam on top, the welding being effected by the pressure between the top roll and the ball, the ball in turn being supported by the lower roll. The welded pipe slips completely over the ball resting in the welding trough. By means of friction rollers the bar is withdrawn from within the pipe, the ball dropping down in the front, and after inspection the pipe is either returned over the second run trough for a second welding, or sent forward in its course.

With the perfection of the Siemens furnace it became apparent that a greater number of the smaller sizes could be welded than one set of welding rolls and bar puller could take care of, while with the larger sizes the operation of welding became slower and the machinery usually ran ahead of the furnace. To increase the rolling capacity of small pipe say below 6-inch, two gutters in the furnace were substituted for one and double sets of welding rolls, or welding rolls, with double grooves were introduced, thereby increasing the output of a furnace considerably.

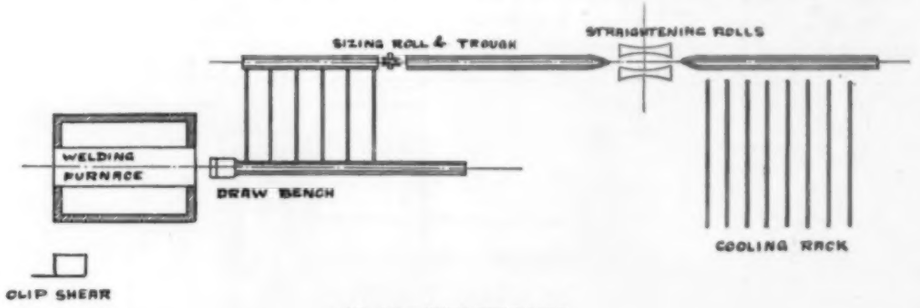


FIG. 12.—BUTT WELD MILL.

Processes After the Welding.

After the pipe is welded, it is passed through a set of sizing rolls built lighter but otherwise very much like welding rolls, where it is reduced to the exact outside diameter required. From thence it travels through the straightening machine, of which quite a number of designs are still in use. Smaller sizes are passed between large reciprocating plates, which roll the pipe back and forth until it is supposed to be straight. Or the pipe is deposited between two long cylindrical rolls, set just far enough apart from each other to let the pipe drop through when perfectly straightened. The best method, however, for

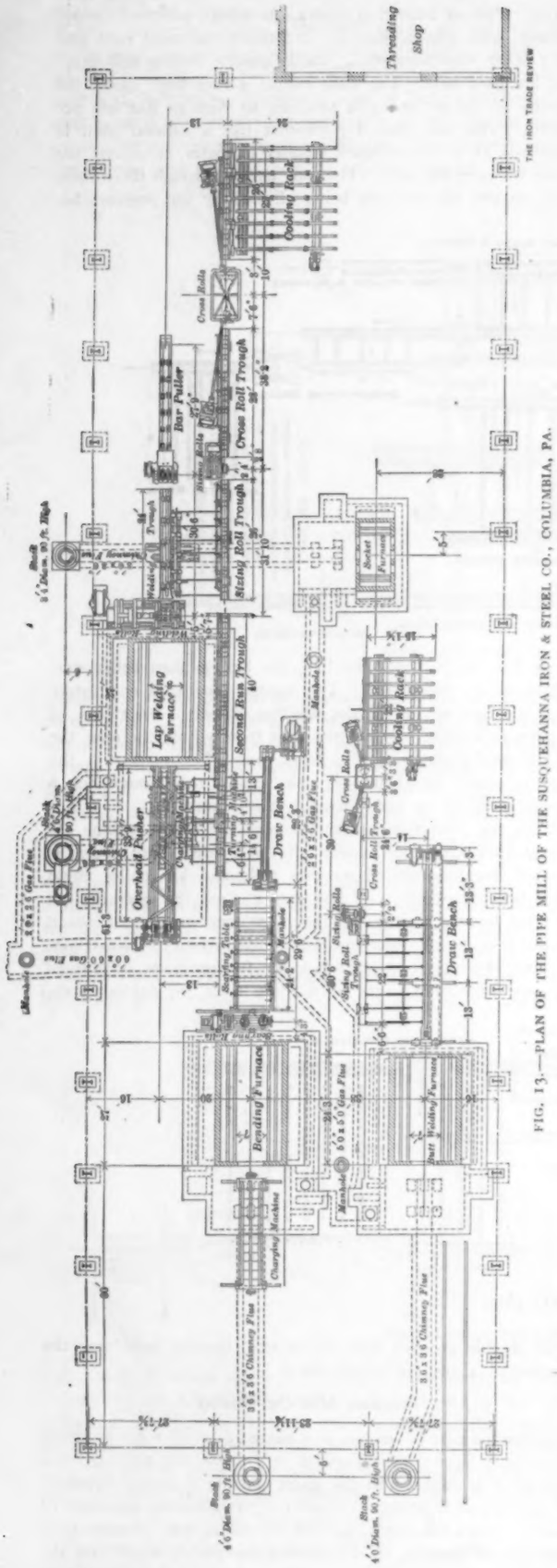


FIG. 13.—PLAN OF THE PIPE MILL OF THE SUSQUEHANNA IRON & STEEL CO., COLUMBIA, PA.

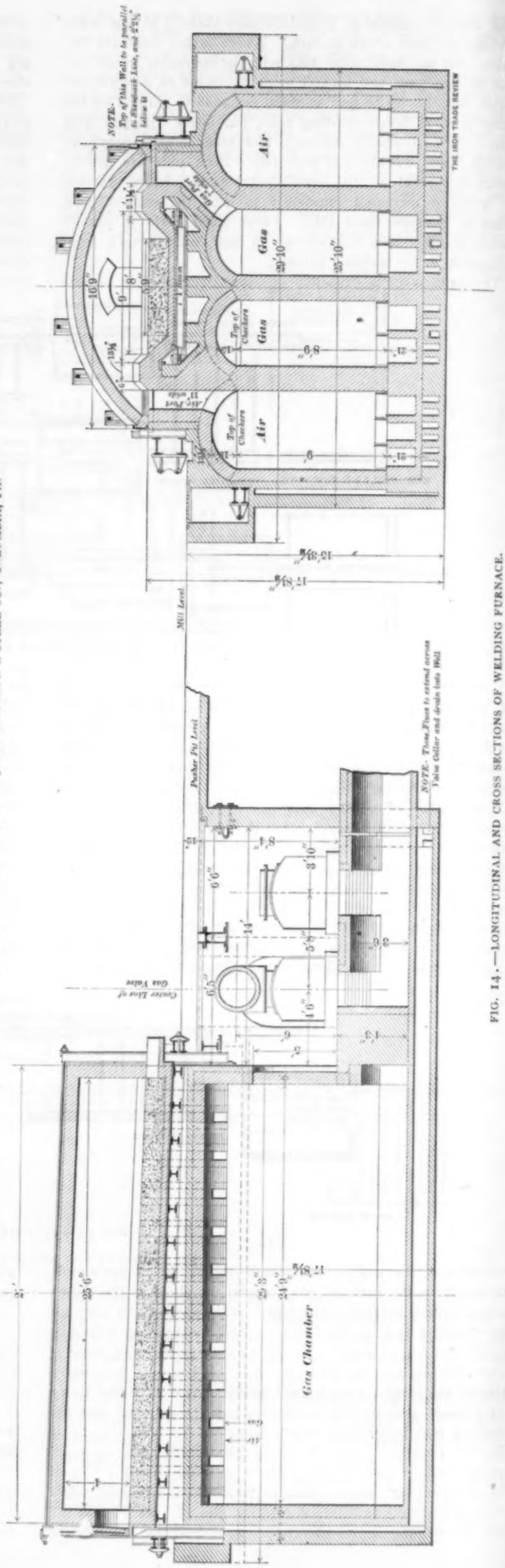


FIG. 14.—LONGITUDINAL AND CROSS SECTIONS OF WELDING FURNACE.

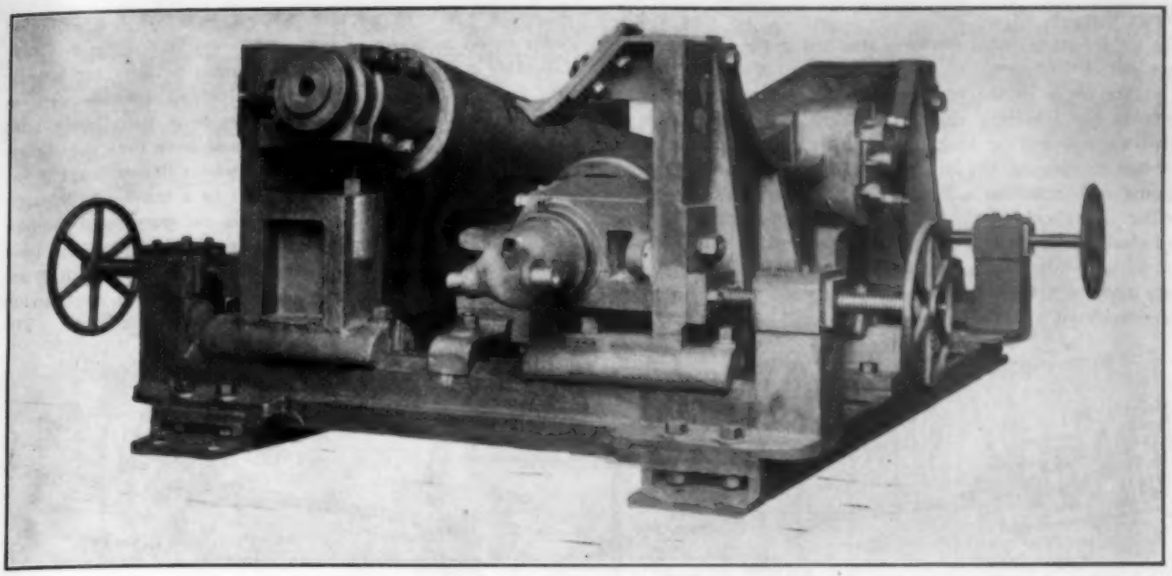


FIG. 15.—CROSS ROLLS, VERTICAL TYPE, FOR 24-INCH PIPE

this purpose is to pass the pipe through two curved rolls arranged above or beside each other on inclined axes, which rotate the pipe, at the same time pushing it forward.

Figure 8 shows the theory of this appliance. To avoid complication only the axis B-B of the lower roll is shown. The surface of the roll wraps itself around the pipe, both surfaces being tangent along a line which is a helix on the surface of the pipe. The forward motion S is equal to the surface speed of the revolving roll Rr multiplied with the sine of the angle of intersection $\propto$, while the surface speed of the revolving pipe $Rp = Rr \cos. \propto$. Owing to the varying diameter of the roll an average diameter must be taken in determining Rr. The curve of the roll proper is a rather complicated affair with the following equation:

$$y = \sqrt{x^2 A g^2 \propto + a^2} \left[2 - \frac{d}{\sqrt{x^2 \sin^2 \propto + a^2}} \right]$$

It would lead us too far into detail to develop this equation, especially since it is without practical value. The proper way of turning the rolls is to fasten a bar of the proper diameter above it in the lathe intersecting it under the proper angle, and then to finish the roll until the proper contact has been accomplished. The drawings show various styles of these machines, in which the rolls are arranged either above and below or on the two sides of the passing pipe. The angle at which the axes of the rolls intersect the axis of the pipe is made adjustable, in order to use the machine for various sizes of pipe, it being apparent from the formula that for any given X and Y the angle of intersection $\propto$ increases in a certain relation to the diameter of the pipe D.

From the cross rolls the pipe is brought upon a cooling bed upon which it slowly travels sideways, while it is held by a number of fingers of the traveling chains, until it is cooled sufficiently to avoid the danger of having its shape again disturbed. The speed and angle of friction is usually figured, that as an additional precaution the pipe rolls around its own axis while traveling over the bed.

Equipment of a Butt Weld Mill.

The machinery of a butt weld mill does not differ materially from the machinery described. Clipping shears are located conveniently at the charging end of the furnace, which clip the front corners of the skelp under an angle of 60 degrees, leaving it about one-third of its original width. The skelp is charged over the whole width of the furnace hearth, strip beside strip, and as fast as the welder pulls out one piece a new one is charged in its place. The draw bench is of very similar construction to the one used for bending skelp, but the chain travels very much faster, reaching often a speed of 400 feet per minute. Rope has been substituted for chain with indifferent success. The bench travels sideways across the full width of the furnace, or is pivoted on its rear end and

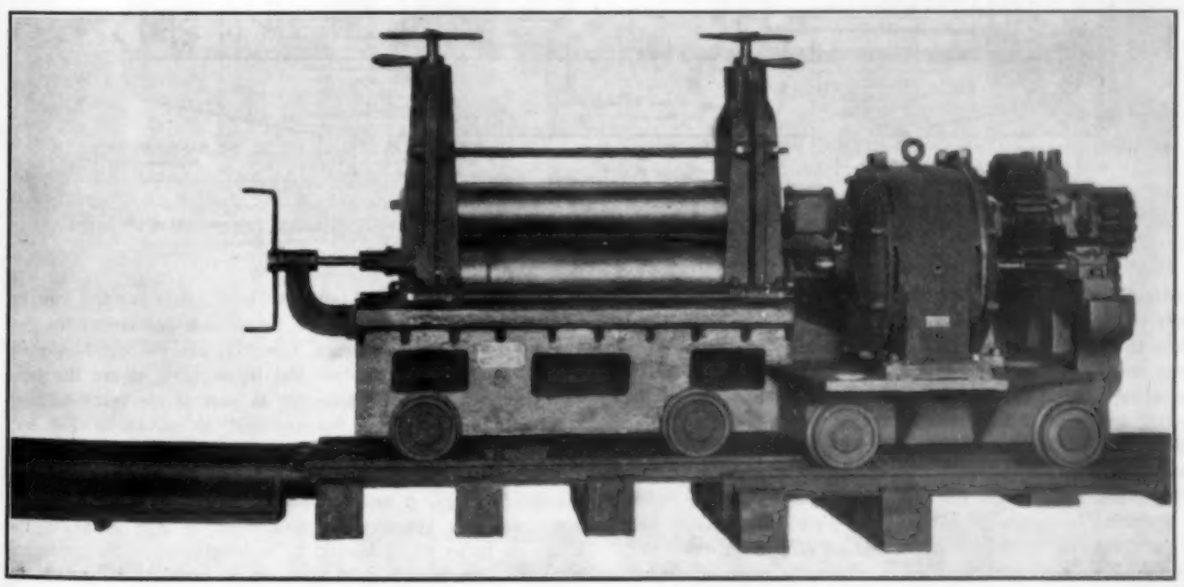


FIG. 16.—MOVABLE, MOTOR DRIVEN, SCARFING ROLLS.

swings through an arc sufficiently large to cover this width. The welder stands on a platform attached to the front or furnace end of the bench. He takes a bell, slips it over the tongs, grips the skelp in the furnace with these tongs, and hooks them to the traveling chain. The bell is pulled against a steadying rest and the tongs first and then the skelp is drawn through its opening, the latter being bent and its edges forced against each other to a firm weld. Several boys assist the welder in unhooking the tongs at the proper time, cooling and cleaning the bells and supplying the welder with both as fast as he needs them. And he does need them pretty lively, since 2,500 to 3,000 pieces of 1-inch butt weld pipe in 10 hours are considered a day's work.

machines. It must be said, however, that such machine in order to do 20 hours of fast work every day under not very favorable conditions in a pipe mill must be built far heavier and far stouter than the ordinary jobbing machine used in machine shops. Rotary shears have been used lately with great success to cut the crop ends and have thus greatly relieved the work of the threading floor. Before leaving the mill every piece of pipe is subjected to a test by hydrostatic pressure, varying according to the size and purpose of the pipe from 300 to 3,000 pounds per square inch. On a bed, built similar to a lathe bed, one stationary and one moving head are mounted. The pipe is inserted between the two, the moving head brought forward until a tight joint is effected. The

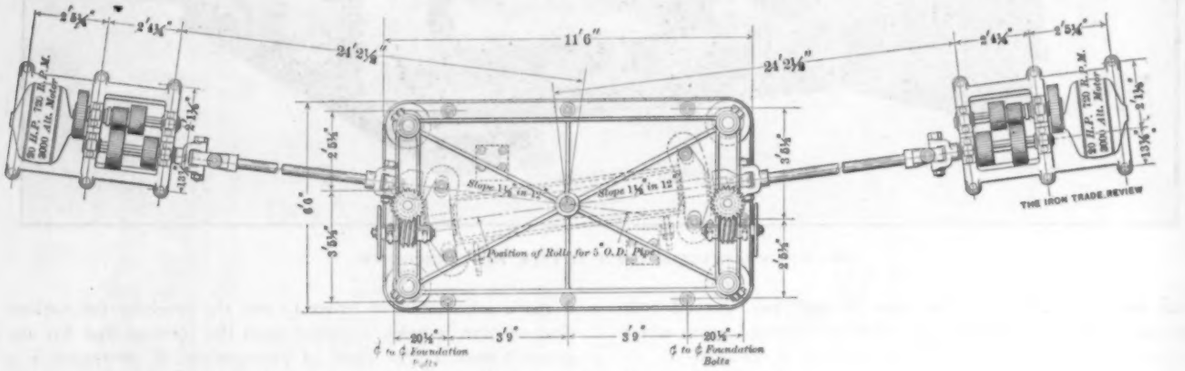


FIG. 17.—PLAN OF CROSS ROLLS FOR PIPE MILL.

The sizing and straightening machines and the cooling rack through which the pipe travels after being welded, are constructed on exactly the same lines as in lap weld work, making allowance, of course, for the greater speed and lighter work.

A few words must be said here as to the manufacture of pipe couplings or sockets, as they are called in pipe mill work. Strips of skelp of the width of the socket and of a length to suit its circumference are heated, bent and welded into a ring. For smaller sizes, coal-heated fires are used, while the larger sizes are heated in small regenerating furnaces. The bending and welding is done either in machines by a system of rollers, or by steam and trip hammers in dies.

pipe is then filled with water from an ordinary supply line and by means of a three-way valve pressure of the desired intensity is applied. Only pipe passing the specified test is allowed to leave a modern mill.

I will conclude my talk with a short explanation of the various ways in which the rolling machinery of a pipe mill is usually arranged. Lap weld mills running on ordinary standard pipe—and this is the product of the greater number of our mills—will use the arrangement shown in Figs. 9 and 10, using only one welding furnace. A good superintendent will be able to turn out a product coming up to the specifications of standard pipe by finishing at least 80 percent of the output in one welding or in one run, as it is called;

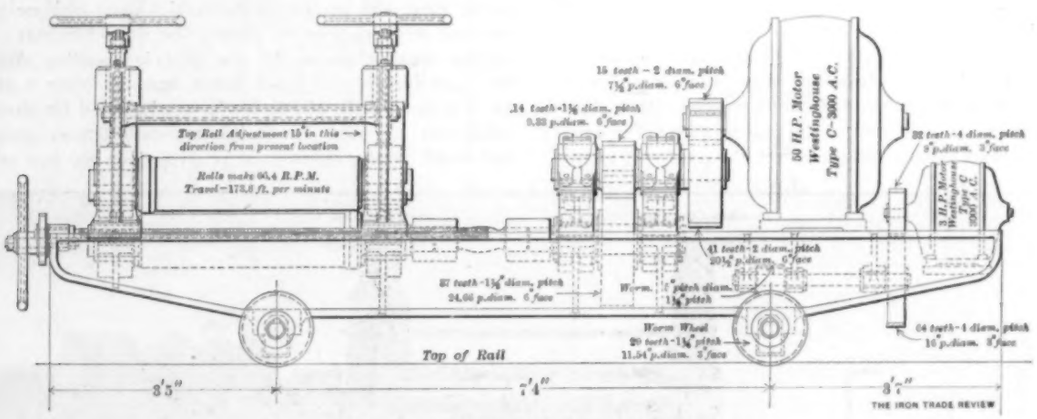


FIG. 18.—SCARFING ROLLS FOR PIPE MILL.

Hydraulic mandrels are forced into them to give the proper taper to their bore in both directions, to insure a tight joint when threaded and screwed onto the pipe. The tapping of these couplings takes place in multiple tapping machines of the same general type as seen in machine shops, only built stouter and heavier to stand the rough work.

After the pipe comes from the cooling rack it is inspected and, if necessary, any kinks or bends taken out by a straightening press, built on the lines of the ordinary punching press, or operating by hydraulic power. The pipe is then distributed to the threading machines, which cut off the rough ends and cut the threads, if such is desired. There is a great number of threading machines in the market, all claiming certain advantages, but all built on the general well-known lines of these

the balance which might not have been safely welded, can be readily returned to the furnace by suitable appliances for the second run. Quite different, however, are the conditions in a mill running on a product like boiler flues, where the customer insists upon a double run as part of his specifications. Then a double welding furnace mill, as shown in Fig. 11, will be preferable, the pipe passing through the operation as shown by the arrow heads. The different arrangements as shown in Figs. 9 and 10 are usually determined by the available floor space, the arrangement in Fig. 9 taking up about 90 ft. in width by 160 ft. in length, while the arrangement as shown in Fig. 10 takes 60 ft. in width by 270 ft. in length. The first is preferable, when it can be installed, since it avoids the turning end for end of the bent skelp between

the bending bench and the charging machine, necessitated by the fact that the part of the skelp, which leaves the bending die last, must enter the welding rolls first, the other end being badly used up and battered by the skelping tongs. Fig. 9 shows a mill for large pipe and, therefore, a set of bending rolls for pipe skelp above 12 inches is added. Figure 12 shows a butt weld mill the arrangement of which can be readily understood.

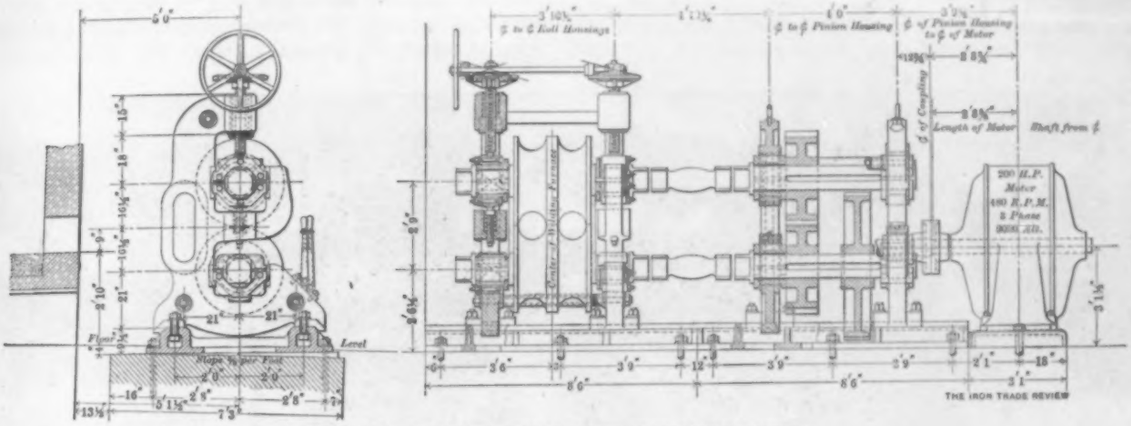


FIG. 19.—END AND SECTIONAL VIEWS OF WELDING MACHINE.

It is understood that changes in the schedule of wages in the offices of the Minnesota Iron Co., Oliver Iron Mining Co., Pittsburg Steamship Co., have been made to take effect shortly. It is possible that the Steel Corporation's railroads may revise schedules later. Changes in mining wages are taking place slowly, though they have been effected in some districts. That they will come in all is conceded by the men under pay. There is no probability that any serious trouble will result anywhere.

At Portland, Ore., Ellis H. Hughes has been sued by the Oregon Iron & Steel Co. for the return of a mass of iron weighing about 15 tons and valued at $15,000, because it is a meteor. The meteor fell on the land of the plaintiff company. Hughes rolled it down hill to his own land. He says it was impossible to roll the meteor up hill. He has erected a shed over it and is charging an admission fee.

Receiver Robert M. Thrall, of the American Galvanizing & Tin Plate Co., of Cincinnati, alleged bankrupt, represented to the United States court at Cincinnati last week that J. L. Perkins & Co., of Chicago, a creditor of the Cincinnati company has made arrangements to pay its creditors 100 cents on the dollar, and Receiver Thrall asked that the proposition be accepted. An order granting the request was made. The Chicago firm will pay 10 cents on the dollar at once, and the balance as follows: Twenty-five percent June 10, 1904; 25 percent November, 1904; 10 percent May, 1905; 15 percent November, 1905; 10 percent in May, 1906. The Perkins company failed early in August, and as its indebtedness consists of money due on notes, of which the Cincinnati corporation is a large holder, it forced the latter into hard straits, and the compromise may put the American Galvanizing & Tin Plate Co. on its feet again.

Notice has been filed with the secretary of state of Ohio that the Phœnix Iron Works Co., Ashtabula, O., has been dissolved. There has been, however, practically no change in the business, as C. O. Tinker, secretary and superintendent of the company, having purchased all the stock, thought best to surrender the charter. Mr. Tinker will continue the business.

An offer has been made to holders of claims against the bankrupt Wabash Bridge & Iron Co., Wabash, Ind., of $60,000 for the plant and machinery; $10,000 cash, and the remainder in bonds running 10 years, the offer to remain open until Jan. 1.

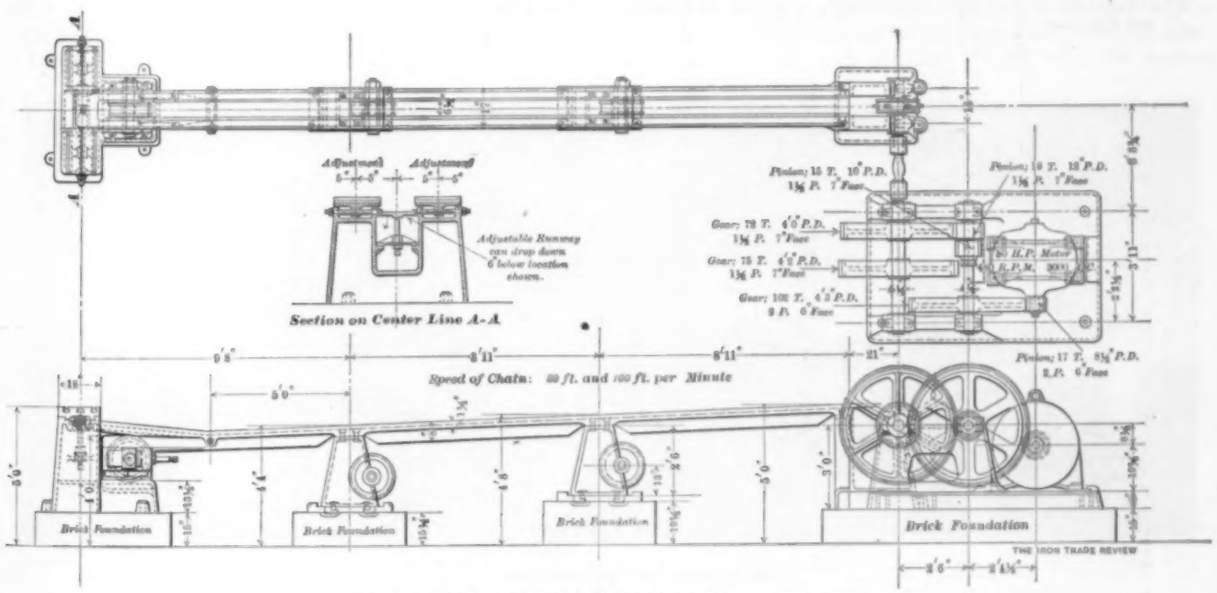


FIG. 20.—PLAN AND ELEVATION OF PIPE MILL DRAW BENCH.

The branch foundry of the International Harvester Co., at Springfield, O., was shut down Dec. 10, throwing 200 men out of employment. The announcement is made that the foundry will be sold and not operated again.

Plant of the Clearfield Steel & Iron Co.

The Clearfield Steel & Iron Co., of Pittsburg, has recently completed and placed in operation at Hyde City, near Clearfield, Pa., a modern rolling mill for rerolling standard section rails into light rails, iron and steel skelp, iron, sheet and tin plate bars, general merchant iron and muck bar. The plant is located on a 15-acre tract lying between the tracks of the Buffalo, Rochester & Pittsburg railroad and the Susquehanna river, thus insuring good shipping facilities and an excellent water supply.

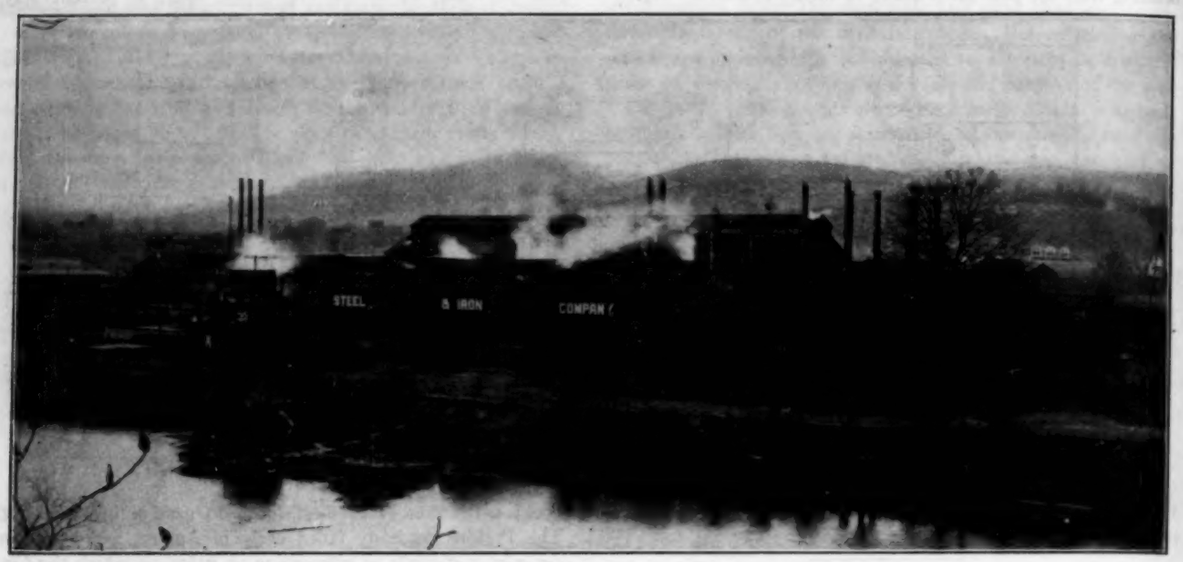
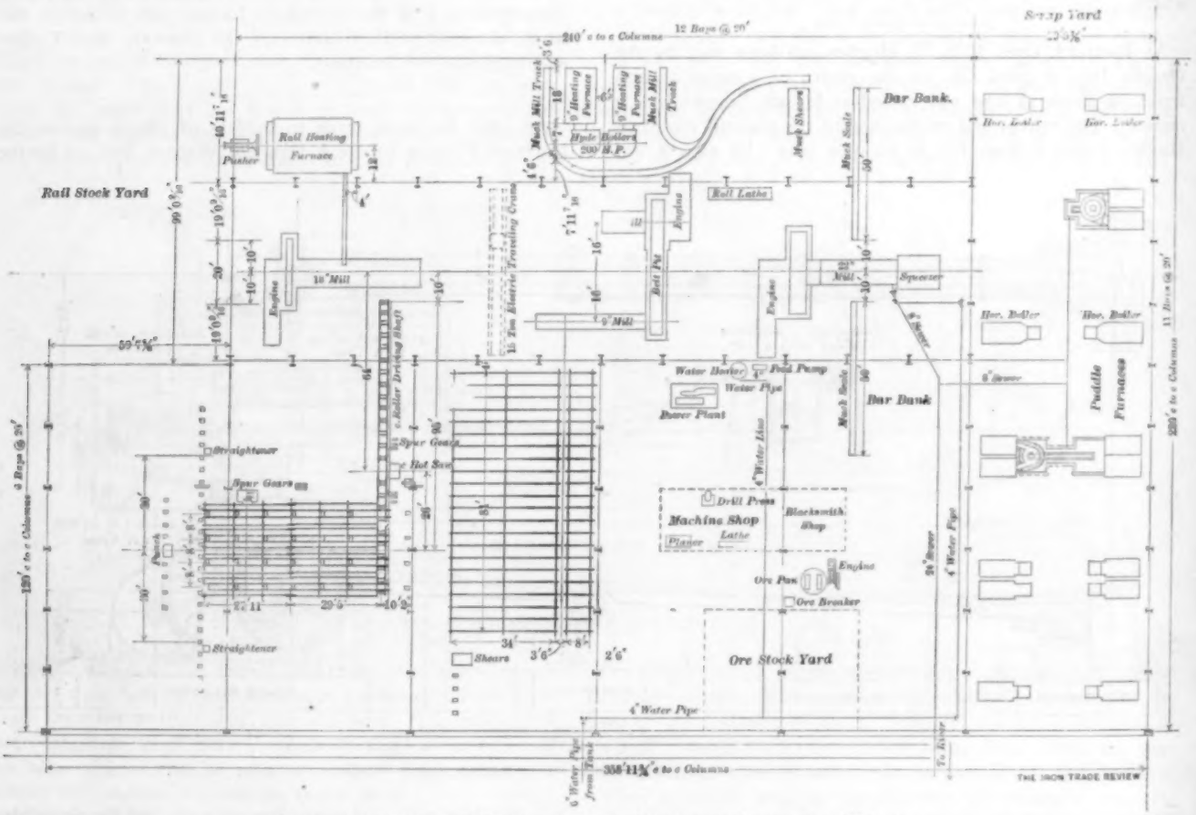


FIG. 1.—PLANT OF THE CLEARFIELD STEEL & IRON CO., HYDE CITY, PA.

The plant is so arranged that each of the columns of the finishing and puddle buildings, and carried down to a sufficient depth to obtain a solid foundation. The entire plant is well sewered, sewers being carried through to the river, and independent sewers are provided for the boiler blow-offs. A concrete retaining wall runs the full length of the plant which forms a loading platform five feet above the loading tracks. In this way material can be easily shipped at a minimum cost for handling. There are two standard gauge receiving tracks on one side of the mill and two shipping tracks of standard gauge on the other side. A 100-ton track scale is placed at a convenient point in the yard


Rail Stock Yard
Rail Heating Furnace
Pusher
Bar Bank.
Rail Lathe
Engine
Mill
Squeezer
Boiler Plant
Water Heater
Feed Pump
Water Pipe
Bar Bank
Puddle Furnaces
Machine Shop
Drill Press
Lathe
Planer
Blacksmith Shop
Engine
Ore Pan
Ore Breaker
Ore Stock Yard
Straightener
Shears
Hot Saw
Roller Leveling Machine
Roller Straightening Machine
Roller Straightening Machine
Roller Straightening

added. The four double puddling furnaces have horizontal boilers, carried on cast iron columns, and steel beams over each furnace, with an iron stack to each boiler. Six of the single furnaces connect with three vertical water tube waste-heat boilers, and are so arranged with dampers that each furnace can be worked independently. The single furnaces are built in pairs 40 feet center to center, so as to give ample working room between the furnaces for proper operation. The steel building covering the furnaces has a ends, which are fitted with cotters so as to be readily removable. The exhaust steam from the mill engine heats the feed water for the boilers in a 3,000-h. p. heater.

Finishing Department.

The finishing mills consist of a stand of 14-inch three-high roughing rolls and four stands of 9-inch finishing rolls worked tandem in combination, and they are driven by a Porter-Allen 26-inch x 42-inch engine of 500 h. p. There are two reverberatory furnaces equipped with Hyde vertical water-tube

FIG. 3.—MUCK MILL, SHOWING TELEGRAPH SYSTEM.

10-foot ventilator running its entire length, for carrying off all gases and smoke. This department is well equipped with grinding pans, ore crushers, etc., and an engine and a line shaft for operating them. In addition there are scrap shears, bar shears, platform scale, buggies, boshes and an ample supply of tools. Each of the furnaces is connected directly with the squeezer by an independent telegraph system, and the bars, as they come from the puddle mill, are weighed on a 50-foot bar scale on each side of the mill, so as to save rehandling and keep an accurate record of the product of each furnace. The squeezer is 60 inches in diameter and is driven with a steel shaft from the end of the puddle mill train. Provision is waste-heat boilers of 200-h. p. capacity each, and are so arranged that one or both can be used in connection with the 18-inch rail mill if desired. Cooling beds 84 feet long and 45 feet wide are provided for straightening and cooling the material from these mills.

The Rail Mill.

The 18-inch rail mill is of special design and consists of two stands of three-high rolls, and an additional stand of bullhead rolls, and is driven by a 36-inch x 48-inch Porter-Hamilton engine of 1,200 h. p. The mill is equipped with a conveyor for delivering the billets or old rails from the heating furnace to the mill, and also for delivering the finished

FIG. 4.—HEATING FURNACES AND CONVEYOR.

made so that the squeezer may be driven by an independent engine, should it be considered advisable in the future to make this arrangement. There is a three-high, 22-inch puddle mill having box and edging rolls and steel pinions and leading spindle. The bed plates are of massive construction and section. The mill engine, a Corliss type 32-inch x 60-inch, with steel shaft, 24-foot fly wheel and all bearing surfaces of ample proportions. It is capable of developing 1,000 h. p. All foundation bolts are of ample size and accessible at the lower product from the mill to the saws and cooling beds. The furnace is of the continuous type, and the pusher is operated by a hydraulic pressure pump and accumulator. The furnace is wide enough to take in rails 15 feet long, with a capacity for heating 10 tons per hour of standard section rails. The rail mill is equipped with rolls for rolling 16, 20, 25, 30 and 35-pound rails, and in addition is capable of producing to advantage structural material, such as angles, etc., and ordinary merchant bar either of iron or steel, if it is desired to

put in rolls for this purpose. The foundations of all the mills and engines consist partly of brick laid in cement, and partly of concrete, the whole underlaid by a concrete bed. The main building is equipped with a 15-ton electric traveling crane running its full length, and as all the mills and large engines are located in this building they can be readily reached by this crane. From the rail mill the rails are conveyed to the hot saws and to the rail cooling beds, to the straighteners, punches, etc.

For the water system there is a pump house with river pumps in duplicate, connecting with the river by a 7-inch main, fitted with strainer. A tank set up on heavy timbers is at such an elevation as to give sufficient head to furnish all the mills with a continuous and ample supply of water. A duplex feed water pump, capable of properly handling hot water, and of sufficient capacity to keep all the boilers supplied is installed. Electric power for cranes, tools and lighting purposes is supplied by a high speed automatic engine connected to a generator of ample capacity.

Charles Hyde is president and H. L. W. Hyde secretary and treasurer of the company.

The new East river bridge, New York, was thrown open to the public Dec. 19. It has been seven years in course of construction, and the total cost was $10,215,239.90. The extreme width of the structure is 118 feet and it has a capacity for four surface railway tracks, two elevated tracks, two vehicle roadways, two footways and two bicycle paths. The steel towers and spans, requiring 12,000 tons of steel, were built by the New Jersey Steel & Iron Co. at a cost of $1,222,230. The steel cables, 5,000 tons, were manufactured by J. A. Roebling's Sons, and cost $1,398,000. The approaches to the bridge were built by the Pennsylvania Steel Co., at a cost of $1,464,000 for the Manhattan approach and $947,000 for the Brooklyn approach. The main span was built by the Pennsylvania Steel Co. at a cost of $1,123,400. The bridge is 1,284 feet longer than the original Brooklyn bridge, and 33 feet wider.

FIG. 5.—VIEW IN LIGHT RAIL MILL, SHOWING PUNCH, STRAIGHTENERS AND COOLING BEDS.

After it had been announced last week that a three weeks' extension had been granted the reorganization committee of the Consolidated Lake Superior Co., the property went through the form of auction and was bought in by Speyer & Co. for $4,500,000. It is claimed that the sale was irregular and illegal and it will be contested.

Judge Lacombe, of the United States Circuit Court, has granted an attachment for $31,405.09 against the Whitaker Iron Co., of Wheeling, W. Va., in favor of Naylor & Co., iron merchants, of New York, for alleged breach of contract for non-payment of steel delivered to them. In May, 1903, it is alleged, Naylor & Co. agreed to sell to the Whitaker Iron Co. 1,000 tons of imported basic Bessemer sheet bars at $31.50 a ton, delivery at Wheeling, payable in cash against inland bill of lading. The steel was delivered at Wheeling in August and September last. Naylor & Co. allege that they duly performed all the terms and conditions of the contract on their part, but that the Whitaker Iron Co. refused to pay any part of the purchase price.

Colorado Fuel & Iron Co.

The special meeting of the stockholders of the Colorado Fuel & Iron Co., which was to have been held in Denver Dec. 15, was adjourned until Jan. 12. It is intimated that opposition from the debenture bondholders to the proposed financial plan of reorganization was the cause of adjournment. Further investigation will be made into the exact condition of affairs at the Minnequa plant. The alleged discrepancy of something like $5,000,000 shown by the books of the Colorado Fuel & Iron Co. is due, it is reported, to the fact that a large part of the money spent for improvements at the Minnequa plant was not charged up to new construction. A notice was promulgated at Denver a few days ago showing that the fuel interests of the Colorado Fuel & Iron Co. have been transferred to a new concern known as the Rocky Mountain Coal & Iron Co. The transfer of all the coke and coal properties to the new company is said to have been made on Nov. 12, but was not known until recently.

Quite a large number of Ohio companies organized under the laws of other States are being re-incorporated under the laws of Ohio. At the November election a constitutional amendment was adopted, abolishing the stockholder's double liability clause of the Ohio constitution. Owing to the removal of this clause, companies are now being incorporated in order to take advantage of other features of the Ohio law. The Geneva Metal Wheel Co., Geneva, O., has recently taken this action.

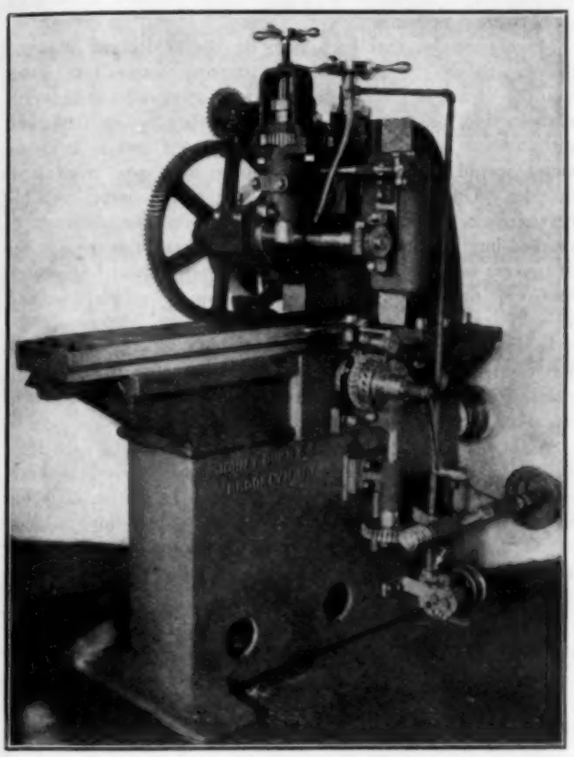
The Norfolk & Western Railroad Co. is preparing to expend $200,000 in the erection of filters along its line in the mountain district, owing to the fact that recently the boilers of locomotives of the railroad have been greatly damaged by sulphur and other substances contained in mountain streams, which have become very low on account of the drought prevailing in the mountains. Repair shops have been kept busy, and it is intended to filter the water to prevent further damage to boilers.

In the superior court of Michigan City, Ind., Fred Smith, formerly an employe of the Inland Steel Co., has obtained a verdict against the company for $10,000 damages. Smith was working for the company June 12, 1902, on an iron column 18 feet high, stringing an electric wire, when a traveling crane came along and crushed his arm so that it had to be amputated.

MILLING AND ROUTING MACHINE.

A keyseat milling and routing machine is the latest product of John T. Burr & Son, of Brooklyn, N. Y. This tool is essentially a powerful milling machine of plain type with the addition of a supplementary vertical spindle, the combination being fitted for milling keyseats and rounding up the ends of the grooves for feathers or drop keys.

The platen is 9 x 48 inches and has three T slots, oil channels and pockets. An automatic feed is permissible to the extent of the 48 inches of table, and adjustable trips are provided for shorter distances. Twelve feed changes are provided for every speed of the main spindle; the latter is made of crucible steel and is 3 inches diameter. Cutters with 1½-inch standard hole and up to 5 inches outside diameter may be used. The distance from center of spindle to platen can be varied from 1⅛ to 11½ inches and the housings will admit work 10⅜ x 9⅜ inches. The friction countershaft allows two changes of the spindle speed. The router spindle has an independent vertical adjustment of 3¼ inches and an independent horizontal adjustment of 3⅛ inches. The greatest distance from end of router spindle to the platen is 13⅜ inches, and this distance can be reduced to any lesser



THE NO. 5. KEYSEAT MILLING MACHINE.

amount at pleasure. The router spindle has standard No. 7 Brown & Sharpe taper hole. The main driving gear is 20 inches diameter and 2½ inches face, 6 pitch, and the driving pulley is 14 x 4¼ inches. The weight of the complete machine is about 3,200 pounds.

In the case of the Central Iron & Steel Co. against the Eastern Tube Co., of Zanesville, Judge Thompson of the United States Court, issued an order of sale which will be reviewed upon motion of interested parties.

The Crane Co., Chicago, Ill., will distribute a large amount of money in the shape of gifts among its employes before Christmas. It is stated that the total of its distribution this year will be about $250,000.

The Niles Car & Mfg. Co., Niles, O., whose plant had been in idleness for some time, has taken a rush order for 25 street railway cars for the Cleveland Electric Railway Co., to replace in part cars recently destroyed by fire.

Hearth Area and the Number of Blast Furnace Tuyeres.*

BY F. L. GRAMMER, BALTIMORE, MD.

The rapid advances on the mechanical side of blast furnace practice have not always been accompanied by a proper appreciation of the metallurgical requirements. This is illustrated occasionally by the improper use of automatic barrow charging devices, and bins (introduced at the expense of accuracy in weight) with ores of irregular composition or ores that have been poorly graded. The 100-foot blast furnace has not always been advantageous, and in many instances the increase in the number of tuyeres, from 8 or 12 to 20, has resulted in decreased output. The data pertaining to this division of blast furnace practice are now sufficiently complete to allow inferences to be made.

The use of fine ores has indicated the manner in which large outputs could be obtained, as it has emphasized the fact that intimacy of contact between gases and ore, and coke and air, were more important than the time of exposure. It was reasonable to suppose that if more points of contact were made between the air and the coke, their union would occur in a shorter period of time, and the coke would be burned more rapidly in the same sized hearth, and an increased output thereby obtained. In consequence of this theory, many furnace men upon relining a furnace increased the number of tuyeres from 8 or 12 to 20, or even more, frequently with unfortunate results. If the number of tuyeres in an old furnace is increased while it is in blast and banked, there will be quite an increase in the output on resuming operations for a day or two, owing to walls having been cleaned. A single advantage which was obtained in one or two cases by the use of multiple tuyeres has been offset by many disasters and, in at least one instance, the furnace wall was cut out within a period of two weeks. Unless the penetration of the blast is properly calculated, there is danger that it will go through the center or up the walls of the furnace. Apart from the increase in the number of tuyeres, the points of horizontal contact also were increased by "oval" tuyeres; "three-way tuyeres;" and a very ingenious "fan-spraying nozzle," which has been described in the *Iron Age*, Nov. 25, 1897.

These patented tuyeres, while hardly accomplishing the object for which they were designed, are not without merit. I have used the three-way tuyere very advantageously on furnaces having a dirty crucible, or having a lodgment on the wall, and by its use I have obtained a clean hearth. Owing to certain objections, however, these devices have never been extensively adopted in regular furnace practice, for if increasing the number of tuyeres had shown more benefits, the practice would have been more widely adopted. The metallurgists of the present generation have experimented with the number of tuyeres used, but no one, so far as I know, has had the temerity to place them in more than one horizontal plane in the last ten years.

The number of tuyeres required in an iron blast furnace must be determined from the hearth diameter, the fuel and ore used, and the grade of metal desired. Taking up first the subject of blast pressure. In a furnace having an 8-foot hearth, the average distance through which the air at one point has to travel, in order to cover the whole hearth area, is the distance from the nozzle to the center of the area, or 4 feet. If the air is introduced at two points, the distance is 0.5756 R = 2.3024 feet; at 4 points, 0.4 R = 1.6 feet; at 8 points, 0.3482 R = 1.3928 feet; at 16 points, 0.3376 R = 1.3504 feet; and at an indefinite number (continuous) 0.3333 R = 1.3333 feet.

As far as assisting blast pressure is concerned, with a hearth of the same diameter, much relief in reducing the pressure cannot be expected beyond the use of 8 tuyeres. Indeed, the pressure necessary to overcome the resistance offered, as represented by the distance from the circumference to the center of the area, will be greater in proportion to the number of tuyeres, because of the greater friction offered by the smaller and more numerous channels which convey the air through the crucible. The 3 percent assistance rendered by decreasing the distance

*Read at the New York meeting (October, 1903) of the American Institute of Mining Engineers.

from 0.3482 R to 0.3376 R is more than offset by the increased friction. The usual experience in using coke and a moderate quantity of fine ore is that, for the same volume of air and the same hearth area, the blast pressure with 16 tuyeres will be from 1 to 2 pounds higher than with 8 tuyeres.

Using from 16 to 20 tuyeres usually means that the fewer tuyeres are lost at scattered intervals by the splash or the drilling of molten iron; the tuyeres wear out rather than burn out, and when one is destroyed the others follow quickly. With a larger number of tuyeres the settling of the charge is apt to be more even than with fewer tuyeres. Also, the dripping of the iron is less marked at any one tuyere. An observation through the peep-sight in the tuyere stock shows that the activity of the movement of the coke is noticeably less with 20 tuyeres than with 10; the volume of the blast being the same in both cases and the diameter of the tuyeres being such as to give the same penetration of the blast. However, a few extra tuyeres are of advantage when the furnace is working irregularly; as it is very easy to plug the extra tuyeres with clay when not needed. Appreciating the fact that it is safer to have extra tuyeres, the tendency—even where no dreams of great benefit exist—is to increase their number.

For a given hearth area the number of tuyeres that should be used is best determined by a comparison with the workings of a furnace of similar dimensions and engine equipment, operating under similar conditions of ore, flux and fuel, and grade of metal produced. Excellent results have been obtained with Lake Superior ores in an 85-foot furnace having an 11 or 12-foot hearth and 8 tuyeres. For the purpose of illustration, assume an 11-foot hearth, having the tuyeres uniformly spaced; in this case each tuyere of equal diameter will cover an area of $\frac{\frac{\pi D^2}{4}}{8} = 11.87$ sq. ft., or, for all practical purposes, 12 sq. ft. If it was decided that the engines and stoves permitted a 14-ft. hearth, $\frac{\frac{\pi D^2}{4}}{11.87} = 13$ tuyeres would be the proper number to have, and on account of columns, it is probable that 12 or 14 would be the number selected, the even number being more easily placed in the construction.

If with a 11-foot hearth and 8 tuyeres, a blast pressure of 10 pounds per square inch were produced, the pressure calculated for 14 tuyeres and a 14-foot hearth would be as shown in the following formula:

$$\frac{7}{5.5} \times \left(\frac{3482}{3400}\right)^2 \times 10 = 13.2 \text{ lb}$$

and adding one pound for increased friction, the final blast pressure would be about 14.25 pounds. Based on this reasoning, an increase in the number of tuyeres will be beneficial.

In the light of our present knowledge it is assumed to be desirable that the horizontal area exposed to a single tuyere, or to a unit volume of air, should be constant for the same stock used.

Immediately after tapping the iron, the coke from 6 to 12 feet below the tuyeres is exposed for combustion. As the level of the molten slag and metal rises the coke becomes covered, and the air must seek coke at a distance more and more vertically above the tuyeres, until at the flushing time the entire combustion, which has now become decreased in intensity, is above the tuyere level. After flushing, the lower limit of the combustion zone drops to the level of the cinder notch, which is generally two feet below the tuyeres. It is fair to assume that, at the same temperature of blast and with the coke of the same size and porosity, a unit volume of blast will attack a given volume of coke. Therefore, if the horizontal influence of a tuyere be restricted, and the blast volume remain constant, the vertical influence of the blast will be increased.

A hearth of small diameter means that the combustion zone extends to a greater height in the furnace than if the hearth were wide and reversing the same volume of wind. It means, also, that the heat is somewhat more intense, as is shown later in this paper. This explains in some measure the fact that the silicon content of pig iron is usually higher with furnaces having a narrow crucible than with those having a wide crucible. In the former the dripping slag and metal remain longer in contact with the incandescent coke before reaching the bottom of the crucible, and a part of the coke is at a higher temperature than is usual in a furnace having a wider hearth.

I do not say that the consumption of fuel is better in furnaces equipped with a small crucible; because there are too many influences which act the other way. With a small crucible, more heat is lost per ton of metal produced, on account of the heat conveyed away through the cooling devices; and in consequence there is less liability for the metal to break out. But, generally, small crucibles assist the assimilation of silicon, and furthermore, under ordinary conditions they can receive a hotter blast without sticking up the furnace than can the usual modern "jumbo." On the other hand, the increase of the horizontal hearth area allotted to a unit volume of the blast should decrease the vertical height of the combustion zone. If this be correct, a 70-foot furnace would derive more benefit by increasing the number of tuyeres than would a 100-foot furnace, because, by decreasing the height through which combustion takes place, we have practically added to the height of the furnace, and for Lake Superior ores a 70-foot furnace is probably too low for best economy of fuel. An increase in the number of tuyeres is analogous to an increase in the area of horizontal influence.

My assumption that each point in the horizontal plane of the hearth at the level of the tuyeres receives the same quantity of air, is probably exaggerated, even with coke. With a sticky fuel or with fine ores poorly distributed, it is quite certain that the air does not pass around the fuel as freely as water would fill the interstitial space in a pail filled with marbles. Under these conditions, the more contact possible between air and coke the better. Two reliable instances of marked improvement, resulting from an increase in the number of tuyeres without increasing engine power or hearth diameter, were obtained in a low furnace treating a charge of 75 percent Mesabi ore, and in a furnace using anthracite fuel.

If small hearths assist to make high silicon iron, large hearths tend to make low silicon iron; in other words, an increase of the number of tuyeres tends to lower the silicon in the pig iron produced in the furnace.

With eight tuyeres, the tuyere is 0.3482 foot distance from the center of its area of control, which extends over the entire space in front of the tuyere. In a hearth 12 feet in diameter, the deflection that air would have to one side, before it meets air from the adjacent tuyere, is shown in the following equation:

$$\frac{\pi\, 12\, (1 - 0.3482)}{16} = 1.53 \text{ ft.} = 18.4 \text{ in.},$$

or, with 16 tuyeres,

$$\frac{\pi\, 12\, (1 - 0.3376)}{32} = 0.78 \text{ ft.} = 9.4 \text{ in.}$$

Using a hard coke, no marked improvement or change could be expected by decreasing the wall of coke below 18 inches to 9 inches. Coke in a finely divided form, and anthracite of small sizes, would hardly find a thickness of 18 inches a barrier to the passage of air. This may explain why many have noticed no improvement in furnaces working under regular and healthy conditions of large and strong coke by increasing the number of tuyeres on the same hearth area.

In determining the size of hearth, it is obvious that the character of fuel must be taken into consideration. A fuel with cellular structures, aside from its disadvantages in the upper part of the furnace, will burn more rapidly than one more dense. Coke having a cellular space of 45 cubic inches (a unit size), compared with charcoal having 150 cubic inches cellular space in same volume, certainly requires a different dimension for the hearth area. Of course, coke is not quite so far behind charcoal as the ratio of 45 to 150, because the combustion of coke is assisted by the great pressure under which these furnaces are operated. The hearth area, besides being controlled by the fuel, should increase in proportion to the additional volume of air deliverable by the engines, as well as to the heat obtainable from the stoves. It required nearly a decade to learn that an increase of 40 percent in the diameter of the hearth necessitated a 100-percent increase in

the engine equipment of the plant, not to mention the stove capacity. The other features of the hearth, such as height of cinder notch and iron notch, cubic capacity compared to total furnace capacity, etc., have been discussed in former contributions to the *Transactions*.

We have discussed the pressure, diameter of hearth and number of tuyeres, for metal of the same grade using a constant and an increased blowing capacity; yet the selection of the most desirable diameter of hearth for a set of entirely new conditions is a problem which can only be settled empirically.

The present treatment of Lake Superior ores with Connellsville or hard coke in furnaces equipped with modern engines is to have a volume of air sufficiently large to fill the empty crucible once every two seconds. A unit volume of air attacks a unit volume of coke, presenting a constant area of surface; and it may be said further that, at the same temperature, the quantity of coke burned varies almost directly as the weight of air supplied. If the volume of air per pound of fuel consumed did not vary from 53 cubic feet, under the best conditions, to 120 cubic feet, in plants having leaky valves, poor engines and split stove casings, we could speak of volumes in place of weights.

In the year 1883 Mr. Witherow thought that at a temperature of from 1,300 to 1,500 degrees C. 140 cubic feet of air per minute, in a furnace using coke or anthracite, would produce 1 ton of cast iron in 24 hours; and using charcoal, 110 cubic feet of air per minute would produce 1 ton of cast iron. At the present time 85 cubic feet of air will produce 1 ton of cast iron under conditions similar to those just quoted. This difference is really very slight, considering the lower fuel consumption incident to the lower silicon content of the resultant cast iron, together with the richer and more easily reduced iron ores used.

It is known, also, that at higher temperatures iron dissolves more carbon, *i. e.*, makes richer iron, and, other conditions being equal, the iron will contain more silicon. Thus, in order to increase the percentage of carbon and silicon in the cast iron produced, the temperature of the furnace must be increased, which is accomplished by using less ore and a more siliceous slag.

It is known that the reduction of magnetites requires a high temperature of the gases escaping from the furnace, or that the gases should be rich in carbon monoxide and, consequently, the quantity of coke burned for a given unit of iron is greater than that resulting from the treatment of Bessemer ores. These remarks apply also to ferromanganese and to silico-spiegel in a greater degree; as the cooling effect of the descending stock does not reach so low in the furnace and, consequently, the temperature in the crucible is higher. The use of soft fuel which will dissolve in the top of the furnace means that more fuel will be required to do the work in the crucible.

A porous fuel, like charcoal, with the pores open and not sealed, as in coke, offers from 8 to 10 times the contact surface on a given weight of fuel for attack by the blast, and its combustion therefore occurs lower in the furnace. The occluding power of charcoal causes it to ignite at a very low temperature. If it were desired to make an iron at a heat near to its freezing point, such as basic iron or forge iron, a fuel easily ignited (charcoal) would be advantageous, especially if cheap and abundant.

Schinz, in 1868, says that the one point about furnace lines of greatest unanimity of opinion is, that wide hearths are better adapted to forge iron and narrow hearths to foundry iron. He also gives the calorific intensity of coke about 100 degrees higher than that of charcoal.

The beter sorting of the ores, the more uniform quality of the coke and the more regular charging of the furnace have resulted in reducing the irregularity in the working and have diminished the demand on the heat of the crucible, consequently a smaller margin of heat in the crucible was permissible and the silicon content of the resultant cast iron became lower. The crushing of the ores and the lowering of the bosh has allowed the silicon content of the cast iron to be lowered without danger of increasing the sulphur content, or of having the charge stick on account of the larger ratio of lime to total silica content in the burden. These results have met with the approval of those interested in developing the practice of smelting Bessemer ores.

A wide hearth will contain a large quantity of molten metal and, acting like a "mixer," it reduces any temporary irregularity in the composition of cast iron, thereby yielding a product of greater uniformity. A soft fuel, with a dull lustre, like charcoal, radiates and absorbs heat more rapidly than a hard fuel, with metallic lustre, like coke or anthracite.

In less than 30 years the ratio of hearth area to greatest bosh area has increased from 1-16 to 9-16, and the furnace capacity in cubic feet per ton metal produced has changed as follows:

CHANGE IN THE FACTORS OF IRON BLAST FURNACE PRACTICE.

Time	Place	Cu. Ft. of Furnace per Ton of Metal Produced in 24 Hours	Remarks
854	England.	190	.....
1870.....	England.	380	Resulted from increasing the height of furnace from original 45 ft. to 75 ft. and more.
1876	United States.	197	Height of furnace from 65 to 75 ft.
1889	United States.	59	Lake Superior ores; smaller proportion of lump sizes; crushed more thoroughly; lower bosh; large volume of air.
1891	United States.	50	.....
1903	United States.	20 to 30	Mesabi ores; wider hearth; increased volume of air; lower silicon in iron.

The data given in the preceding table show that the fine size of the ore allows a lower silicon content of the pig iron produced and yields a better contact of blast, which permits an increased volume of air to be used and a corresponding decrease in the time of exposure. Schierz says that the time of exposure in the reduction zone should be relatively 4.53 for spiegeleisen, 2.75 for foundry iron and 1. for forge iron. He says, also, that these ratios can be reduced by increasing the volume of air. Gruner gives, as a desirable diameter for the crucible of furnaces using charcoal, 20 inches up to 9 feet, and for furnaces using coke, up to 10 feet. For furnaces using coke he gives the following cubic capacity of the crucible: Furnaces producing from 2 to 5 tons of pig iron in 24 hours, from 18 to 36 cubic feet; producing from 5 to 10 tons in 24 hours, from 36 to 62 cubic feet; producing from 10 to 20 tons in 24 hours, from 72 to 144 cubic feet; and producing from 40 to 60 tons in 24 hours, from 216 to 288 cubic feet.

Modern American practice is from 3 to 3.5 cubic feet of crucible capacity per ton of metal produced in 24 hours. Gruner says that for lean ores the size of hearth is greater per ton of metal produced than for rich ores. These early authorities are quoted merely to show their ideas on the subject. Practically, for the same volume of air the silicon content of the resultant cast iron may be raised, or a more refractory charge reduced, by lightening the burden, an act which raises the zone of incandescent coke and usually increases its temperature. The temperature of the hearth also may be increased by raising the temperature of the blast. On the other hand, on those ore and other material which have not been proven to be as independent of time exposure as are Lake Superior ores, the inclination is to use a lesser quantity of blast, which suggests a smaller hearth diameter commensurate with the reduction of blast, in order to give a longer time of exposure.

For porous materials like charcoal, conditions opposite to those for coke hold, and being soft it requires a smaller hearth, because of the pressure of the superincumbent charge and because it offers so large an area of surface contact for attack. For hard, dense materials like coke, offering fewer surfaces of attack on a metal requiring small fuel margins, such as basic iron, a shape of furnace is desirable which will allow the quick removal by the rising gases of the heat generated, and that shape is a wide hearth. Furthermore, a wide hearth offers the proper volume of coke to the attack of the blast, and with a low vertical ignition the spreading of the heat is facilitated laterally more than vertically for the same quantity of air. This may mean a slightly lower temperature at the hottest region.

I hesitate to say exactly what is the proper hearth for the

production of an iron of a given silicon content, because economy in coke consumption is regarded differently in different localities. Some metallurgists think that where coke is expensive, the hearth area in making foundry iron should bear approximately that relation to the hearth area in making Bessemer metal as the Bessemer time exposure does to the foundry iron time exposure. This is to be the relation if the furnaces producing foundry and Bessemer irons have the same stove and engine equipment, the same richness of ore and the same nature of the ore apart from phosphorus. This statement is crude, but it holds true in general. The natural field for experimenting on the dimensions of the blast furnace has been in those furnaces producing Bessemer irons, as they are usually assembled in larger units near together, and hence are more easily compared and studied.

"Inversely as the coke consumption" might be considered a better rule for varying the diameter of the hearth. When the relation between hardness and calorific intensity, porosity and rapidity of ignition—softness and solubility in carbon dioxide—(disregarding the chemical percents) have been shown by our technical schools, we can speak other than by rule of thumb.

Testimonial Dinner to I. W. Frank.

On Tuesday evening, Dec. 15, a testimonial dinner was given Isaac W. Frank at the Union Club, Pittsburg, by the Pittsburg district members of the National Founders' Association, in celebration of Mr. Frank's election as president of that organization. The following were in attendance: Geo. Mesta, W. H. Rea and W. O. Horning, Mesta Machine Co.; W. H. McFadden and M. W. Westerman, Mackintosh-Hemphill & Co.; Stewart Johnston, Pittsburg Steel Foundry Co.; Edward Kneeland, Mr. Bray and C. E. Saker, United Engineering & Foundry Co.; D. J. Thomas, Sterritt-Thomas Foundry Co.; W. J. Carlin and Thos. McBride, Thos. Carlin's Sons Co.; Wm. Yagle, Yagle Foundry & Machine Co.; H. M. Wilson and J. H. Johnston, Taylor-Wilson & Co.; H. T. Irwin and C. W. Jones, Rosedale Foundry & Machine Co.; Thos. Christian and J. F. Whitehead, Standard Sanitary Mfg. Co.; John McLaren and W. J. Phillips, Phillips & McLaren; Geo. Rawlins and E. P. Botsford, Pittsburg Malleable Iron Co.; Jas. Allen and Mr. Henry, Union Steel Casting Co.; J. R. Robinson, Robinson Machine Co.; W. S. Gerdes, Hall Steam Pump Co.; L. W. Frank, Duquesne Steel Foundry Co.; L. H. Davis, J. W. Davis and W. A. Harris, Lewis Foundry & Machine Co.; H. C. Shaw, A. Garrison Foundry Co.; Maj. Jos. T. Speer and Mr. Ogden, Pittsburg Valve, Foundry & Construction Co.; Geo. M. Cooper, secretary Manufacturers' Association of Pittsburg; F. H. Zimmers, Union Foundry & Machine Co.; Geo. V. Milliken, Pittsburg Mfg. Co.

Structural Steel Car Co.'s Plant Sold.

The plant of the Structural Steel Car Co., Canton, has been sold by U. S. Johnston, trustee in bankruptcy, to J. R. Blakeslee, president of the Ajax Mfg. Co., Cleveland, and George C. Dissette, attorney and real estate dealer, Cleveland, for $73,000. The company was organized about two years ago to manufacture steel cars for railroads. It acquired a tract of 33 acres and erected a plant, consisting of a main building 506 x 78 feet, an office building and several other structures. Modern equipment was installed. Financial embarrassments, resulting largely from insufficient capitalization, prevented the completion of the plant, and in July, 1903, a receiver was appointed. In September Mr. Johnston was appointed trustee. The property was appraised at $77,543, much less than one-half the original cost.

The city of Savannah, Ill., has purchased the Fulton Steel Siding Plant, Fulton, valued at $10,000. The plant will be moved from Fulton to Savannah in January and will be in charge of George and J. H. Hawkins. Steel ceilings and general sheet metal work will be manufactured.

The Bogenschutz foundry, Covington, Ky., was sold a few days ago at master commissioner's sale to John Droege, of the Licking Rolling Mill Co., Covington, for $10,505.

FOUNDRY WAGES AND HOURS IN 1903.

The *Iron Molders' Journal* has the following review of the year 1903 from the standpoint of that organization:

"The year opened with trade conditions such as have rarely existed, and everywhere came the call for molders. As the early months passed this demand became more pressing, and during the last month of spring a larger number of members were employed than ever before. Unfortunately this condition has been changed, and the outlook for the immediate future is not as bright.

"It has been the most prosperous year we have ever experienced in point of growth, approximately 16,000 members having been initiated. This large increase, while strengthening our hands, has carried with it additional responsibilities. An element of danger always accompanies the rapid growth of any organization, and the trades union is no exception to the rule. The policy outlined and the methods pursued by the I. M. U. have more than any other factor assisted us in building up an organization that stands second to none, and we expect that our new members will profit by the mistakes of the past and assist in continuing the methods that have been so eminently successful.

"In the matter of securing an advance on the wage rate and shortening the hours of labor, we have been most successful. In three or four instances serious strife has taken place between the foundrymen and our members, but in the large majority of cases better conditions have been established through the medium of friendly and businesslike conference. Advances on the wage rate have taken place quite generally, and several of the larger foundry centers have established, after years of endeavor, a $3 minimum. The effort to secure a nine-hour day has also met with marked success, the number of nine-hour shops having increased over 200 percent. The policy outlined by the delegates to the Toronto convention relative to the shorter work day has been carried out with gratifying results.

"The most important and far-reaching step taken during the year has been the amalgamation of the C. M. I. U. of A. with the I. M. U. of N. A. Our brethren of the core room had proved their ability to build up an organization that could protect and advance their interests, they had shown an intelligence and perseverance that were most commendable, and above all had developed among their members the principles of sterling trades unionism before taking the step that made us one. The merger has so far proved of value to all; a stronger bond of sympathy has been created between the core and molding rooms, and the mutual interest existing between the two departments has been brought out more clearly.

"An advance of wages in the core room has been secured in most instances where the request has been made, or its equivalent, a shortening of the nours of labor without a reduction on the former wage rate. The unfortunate conditions that occasionally arose owing to the existence of two organizations in the foundry will no longer confront us, and as a united body we are better prepared than ever before to protect our interests."

The firm of Richards, Little & Co. has been organized at Pittsburg by W. K. Richards and J. G. Little, of Pittsburg, and A. M. Crane, of Chicago. The new company will deal in coal and coke, iron and steel and railroad and mine supplies generally. Mr. Richards was connected for several years with the Monongahela River Consolidated Coal & Coke Co. and Mr. Little was formerly traffic manager of the Crucible Steel Co. of America. Mr. Crane is well known in the iron and steel trade, particularly in Chicago and Pittsburg. Offices have been opened in the Frick building.

A cablegram from London says: "A conference of the Scotch steel makers has resulted in an agreement whereby ship plates, boiler plates and angles branded as iron will be sold at fixed rates, 60 cents to $1.25 per ton above the present quotations. The present competition is thereby ended."

Michael Bisenius, engaged in machinery business at St. Cloud, Minn., has filed a petition in bankruptcy, placing his assets at $45,833 and his liabilities at $37,581.

INDUSTRIAL SUMMARY.

[If you are in need of machinery of any description, please notify *The Iron Trade Review*, and we will put you in communication with our advertisers at once.]

New Buyers in the Market and Some of Their Wants:—

The Milwaukee Steel Foundry Co., Milwaukee, Wis., has been incorporated to manufacture and deal in steel castings. The capital stock is $10,000. Incorporators are: C. F. Maynard, W. T. Maynard and J. G. Shaw.

The Shelby Foundry Co., Shelby, O., has been incorporated with a capital of $10,000. Incorporators are: W. R. Hopkins, C. Kowalski, Frank M. Cobb, Ben P. Cole and John Chamberlain.

The Ober Mfg. Co., Chagrin Falls, O., has been incorporated with a capital of $40,000 to manufacture machinery, sad irons, handles, lumber, etc. The incorporators are: Martha M. Ober, Lena B. Woodburn, Addie R. Ober, Laura A. Matthews, A. M. Ober and M. W. Woodburn.

The Sucker State Drill Co. has been incorporated at Belleville, Ill., with a capital of $35,300. The incorporators are: Oscar Liese, Walter Liese and Julius Liese.

The Midland Metal Co., Philadelphia, has been incorporated with a capital of $10,000.

The Eclipse Rolling Mill & Mfg. Co., Birmingham, has been incorporated with a capital of $50,000. The officers are: William H. Graham, president; Ernest R Rowley, vice president; Thomas J. Rowley, general manager, and John J. Wirth, secretary and treasurer. The firm will erect a rolling mill to manufacture iron and steel.

The Tompkins Bros. Co., Troy, N. Y., has been incorporated to manufacture machinery. Capital is $50,000. The incorporators and directors for the first year are: A. Tompkins, I. A. Tompkins and E. Tompkins, all of Troy, N. Y.

The Southwestern Foundry Co., Dallas, Tex., has been incorporated with a capital of $3,000 to do general foundry business.

The McGregor Automatic Boiler Feed Co., Detroit, Mich., has been incorporated with a capital of $50,000. The stockholders are: Norman R. Roadhouse, Thomas L. McGregor, Robert H. Murray, Francis Tricker and Charles Kudner.

The Corinth Engine & Boiler Works, Corinth, Miss., have been organized with a capital of $50,000. The stockholders are: J. E. Creary, J. H. Jones, R. M. Weaver, H. E Walker, M. B. Abbey, and others.

The directors of the Columbia Nut & Bolt Co., Albany, N. Y., recently incorporated, are: John J. Donovan, 319 West 112th street, New York City; Thomas Hill Low, 473 West 145th street, New York City; James B. Henney, 141 Broadway, New York City.

P. & F. Corbin, Chicago, have been incorporated with a capital of $25,000 to manufacture and deal in hardware and metal goods. The incorporators are: Walter C. Haight, Frank T. Murray and Perry M. Kenworthy.

Sealed proposals will be received at the office of the supervising architect, Washington, D. C., until Jan. 7, for the low-pressure and steam-heating and ventilating apparatus complete in place for the United States custom house and postoffice building at Newport News, Va.

Springfield, O., is soon to have a new industry, which will manufacture bed springs. The company is composed of John T. Ricks, T. R. Ludlow, D. O. Myers and Harry C. Franks, and it will be capitalized at $50,000. Machinery has already been ordered. The company expects to be in operation March 1, employing about 50 men.

Fires and Accidents:—

The plant of the Davis Gasoline Engine Co., Waterloo, Iowa, was destroyed by fire Dec. 15. Loss, $60,000; partially insured.

The Cascaden foundry, occupied by the Cascaden Mfg. Co., and Waterloo Motor Works, Waterloo, Iowa, was destroyed by fire Dec. 14. Loss on building, machinery and stocks, $50,000.

Eight men employed by the Grand Crossing Tack Co., Chicago, Ill., were injured and some of them narrowly escaped death in an explosion outside the company's plant, Dec. 16. Over five tons of slag, a molten mass, rolled into a pool of water and exploded, scattering fragments in all directions, injuring the eight employes and shattering the windows of the plant.

Stock building No. 1, of the Maryland Steel Co., Sparrows Point, Md., was damaged by fire Dec. 13. Loss, $22,000; entirely covered by insurance.

The foundry and machine shops of F. E. Came, manufacturer of railway specialties in Montreal, were destroyed by fire Dec. 9. Damage, $25,000.

The Baltimore & Ohio R. R. shops at Lorain, O., were burned Dec. 19, together with considerable rolling stock, tools and machinery, entailing a loss of over $100,000.

The plant of the McShane Mfg. Co., Baltimore, was visited by fire Dec. 21. Loss, $50,000. The company went into receiver's hands ten days ago.

New Construction:—

The Hampden Stove & Range Co. has purchased land near Hampden, Mo., and will erect a plant for the manufacture of stoves. The capital stock is $100,000.

Announcement is made at Allentown, Pa., that Richard Loper, of Philadelphia, will construct a bridge over the deep ravine which separates Allentown from Salisbury. The structure will be 1,904 feet in length and 120 feet high, and will cost $300,000. Doyle & Doak, of Philadelphia, will be the builders.

The Morgan Machine Co., Rochester, N. Y., expects to begin early in the spring the building of its new plant, which will be a one-story structure 289 x 152 feet. The company has purchased 7½ acres at Brighton, just outside the city limits of Rochester, on which the new plant will be located.

The McMartin Bros., Duluth, Minn., will soon have charge of the large plant at Manitoba. It will be located in Winnipeg, and as already incorporated, is known as the Winnipeg Ceiling & Roofing Co. A site for the plant has been purchased at Fort Rouge, where buildings upon a lot 220 x 400 feet are to be erected. It is the purpose of the company to manufacture for the Western Canadian trade all kinds of metallic building material in the shape of iron roofing, iron siding, cornices, etc. The company expects to have the plant in operation by March 1. It has a capital of $50,000.

The Hoquiam Iron Works, Hoquiam, Wash., have purchased two lots and intend erecting a complete up-to-date machine shop and foundry. There will be two buildings, each 50 x 100 feet.

The Kent Machine Co., Toledo, O., expects to have its new building now under construction completed by Jan. 1. All contracts have been placed.

The Galesburg Machine Works, Galesburg, Ill., have just completed a new foundry building, which will be placed in operation in the spring.

The Price-Evans Foundry Co., Chattanooga, Tenn., has already started to rebuild the portion of its foundry which was destroyed by fire on the night of Dec. 5, and will be in position to take care of all orders by Jan. 15.

The Jacobson Machine Mfg. Co., Warren, Pa., has under construction a building to be used, when completed, as an erecting room and machine shop. The company has been delayed temporarily in completing this building, but will do so in early spring. The building under construction is 230 feet long by 55 feet wide, and will be equipped with a traveling crane. The company states that the delay in completing this building has not delayed its gas engine work, as it is going ahead with all sizes, and is in shape to receive inquiries or orders for either gas or gasoline engines of any size.

A one-story brick machine shop and an engine house will be built by Edward Renneburg & Son, Baltimore. The machine shop will be 125 x 40 feet, and the engine house 50 x 30 feet.

H. B. Hamlin, of the Independent Rolling Mill Co., Cuyahoga Falls, O., states that an 8-inch mill will be installed in the plant provided the town of Cuyahoga Falls will guarantee adequate fire protection.

Improvements which will cost about $300,000 will be begun at the shops of the Southern Pacific Co., at Sacramento, Cal. An addition to the machine shop will be erected, 80 x 115 feet.

The addition will be so built as to permit the installation of a traveling crane capable of lifting a locomotive.

The Schubert Bros. Gear Co. has decided to remain in Oneida, N. Y., in spite of inducements to move offered by other cities. The company will erect a brick structure, four stories high, in front of the present plant.

Richardson & McCorkle, of Pendleton, Ore., have purchased two lots, upon which a big machine shop, 100 x 140 feet, will be erected.

The Pittsburg and Valley Districts:

The plant of the Pennsylvania Car Wheel Co., Allegheny, Pa., resumed operations this week after an extended idleness.

It is reported on authority that the South Sharon, Pa., mills of the American Steel & Wire Co. will resume operations about the middle of January.

The W. DeWees Wood plant of the American Sheet Steel Co., McKeesport, Pa., resumed in all departments this week. The plant, with the exception of three small departments, has been in idleness for some time.

The plant of the McKees Rocks Mfg. & Foundry Co., McKees Rocks, Pa., which was placed in the hands of a receiver some time ago, having liabilities of about $28,000, was sold at receiver's sale last week to the Martin Hardsocg Mfg. Co., of Allegheny, Pa., for $12,000. The plant of the latter was recently destroyed by fire and it has been decided to remove the plant entirely to McKees Rocks and not to rebuild in Allegheny.

The Bessemer plant of the Republic Iron & Steel Co., Youngstown, O., which was shut down in all departments some time ago, will resume operations on Monday, Dec. 28.

The Edgar Thomson plant of the Carnegie Steel Co., Braddock, Pa., as previously indicated, was shut down in all departments last week for extensive repairs. It is expected that the rolling of rails will be resumed about the middle of January.

Furnace No. 3 at the Ohio works of the Carnegie Steel Co., Youngstown, O., was blown out last week for relining and repairs. During the period of idleness the height of the stack will be reduced from 105 to 90 feet, the same height as that of No. 4. Experience in operating the two furnaces has shown that the lower stack can be operated much more economically and to better advantage and is in line with the present practice to limit the height of the furnaces. Two furnaces are now idle at this plant.

The Westinghouse Air Brake Co., Pittsburg, has received an order for 1,000 sets of air brakes from the Russian Government, to be used in the equipment of a similar number of freight cars on one of the Russian railroads.

General Industrial Notes:—

The Boston Wire Stitcher Co., recently incorporated, has installed a plant at East Greenwich, R. I., and will manufacture the Boston wire stitching machine. The stitcher is the invention of Thomas A. Briggs, of Arlington, Mass. At present two sizes are being manufactured, but the full line of five sizes will be on the market during the coming year. The new plant commenced operations last week, having sufficient orders ahead to keep it busy until spring.

The Hancock Disc Plow Co., Alton, Ill., recently incorporated, does not expect at present to build, but will have plows manufactured under contract.

The Newport Rolling Mills, Newport, Ky., has again suspended operations until labor costs can be readjusted.

It is announced at Findlay, O., that a new steel plant will soon be established in that city. The buildings secured for the new concern were occupied by the Findlay Axe & Tool Co. prior to the latter's removal to the works formerly occupied by the Salem Wire Nail Co. It is owing to the needs of the Findlay Axe & Tool Co. that the new industry is to be established in Findlay, and the product will be used exclusively in the manufacture of axes and tools.

One of two furnaces of the Standard Malleable Iron Co., Muskegon, Mich., closed down Dec. 12 on account of lack of orders. About sixty men are out of work.

The New Jersey Bridge Co. has secured the contract to construct the new steel bridge over the upper Hudson river between Glen Falls, Warren county, N. Y., and South Glen Falls, Saratoga county. The cost of construction will be $7,500,000.

The American Bridge Co. is reported to have taken a contract for 5,000 tons of bridge material for the Fusan-Chemulpo railroad, Corea, now under construction.

The Sebring Forge Co., Sebring, O., has closed down for an indefinite period, during which the company will install new machinery for the purpose of manufacturing turnbuckles.

John H. Walters, superintendent of the Central Foundry Co., Vincennes, Ind., has closed down the plant because of labor troubles.

The Warm Springs Foundry Co., Salt Lake City, Utah, organized to acquire the foundry heretofore conducted by A. R. Lundin, has filed articles of incorporation. Its capital is $3,000.

The foundry of the J. I. Case Threshing Machine Co., Racine, Wis., started up Dec. 14. The other departments will be in operation by Jan. 1, when 1,500 men will be employed.

The 18-inch mill at the East Works of the American Iron & Steel Co., Lebanon, Pa., has resumed work after two weeks' idleness.

The Ashland Steel Range Mfg. Co., Ashland, O., started its machinery Dec. 18 for the first time.

The Waukesha Expanding Metal Co., Waukesha, Wis., recently incorporated with a capital of $40,000, will manufacture metal lath. The company's plant will be in operation about Feb. 1.

A. J. Burton, Grand Rapids, Mich., contemplates establishing a plant at Vancouver, British Columbia, for the manufacture of saws.

The Dominion Steel Whiffletree Co., Leamington, Ont., has increased its capital stock and engaged A. F. Hatch, formerly with Gault Bros., Toronto, as general manager. The company intends to increase the number of lines of steel goods which it produces.

The Republic Iron & Steel Co. has resumed operations at its plant at Alexandria, Ind., which was forced to close down through lack of gas. Coal will be used in the future.

The Pençoyd Iron Works has transferred the office at Wissahickon, Pa., to the new works at Economy, Pa. Many of the employes have left to seek homes elsewhere. Only the bridge works are running, giving employment to less than 1,000 men, which is about one-fourth the number at work several months ago.

The plow department of the Columbus Iron Works Co., Columbus, Ga., is running half the night, in addition to the day run, the long hours being made necessary by the rush of orders.

Over 800 men resumed work at the Sligo Iron & Steel Co.'s mills, Connellsville, Pa., Dec. 14. The plant has been idle for a number of months and extensive repairs have been made.

The La Crosse Plow Co., La Crosse, Wis., has increased its capital from $200,000 to $350,000, of which $150,000 is to be preferred stock bearing 6 percent interest.

The Uniontown Acme Radiator Co, Uniontown, Pa., has just established a jobbing foundry, and is prepared to make gray iron castings and do machine work.

The Webster Mfg. Co., Chicago, whose recent incorporation was noted last week, is not a new company, having been first established in 1876, incorporated in 1882 and re-incorporated recently. Capital stock is $350,000.

The Roberts-Snyder Co., Columbus, O., recently incorporated, will manufacture passenger and freight elevators of all kinds and do a general line of machine work. The company does not expect to build, nor is it in the market at present for machinery. It purchased a plant already equipped, which will meet all requirements for the present.

The John Ramming Machine Co., St. Louis, recently incorporated, will carry on the business established in 1879 by John Ramming, who died on Nov. 30. At present the company will not increase its plant, as the plant is perfectly equipped for its work, which is building improved Corliss engines, brick machinery and special machinery.